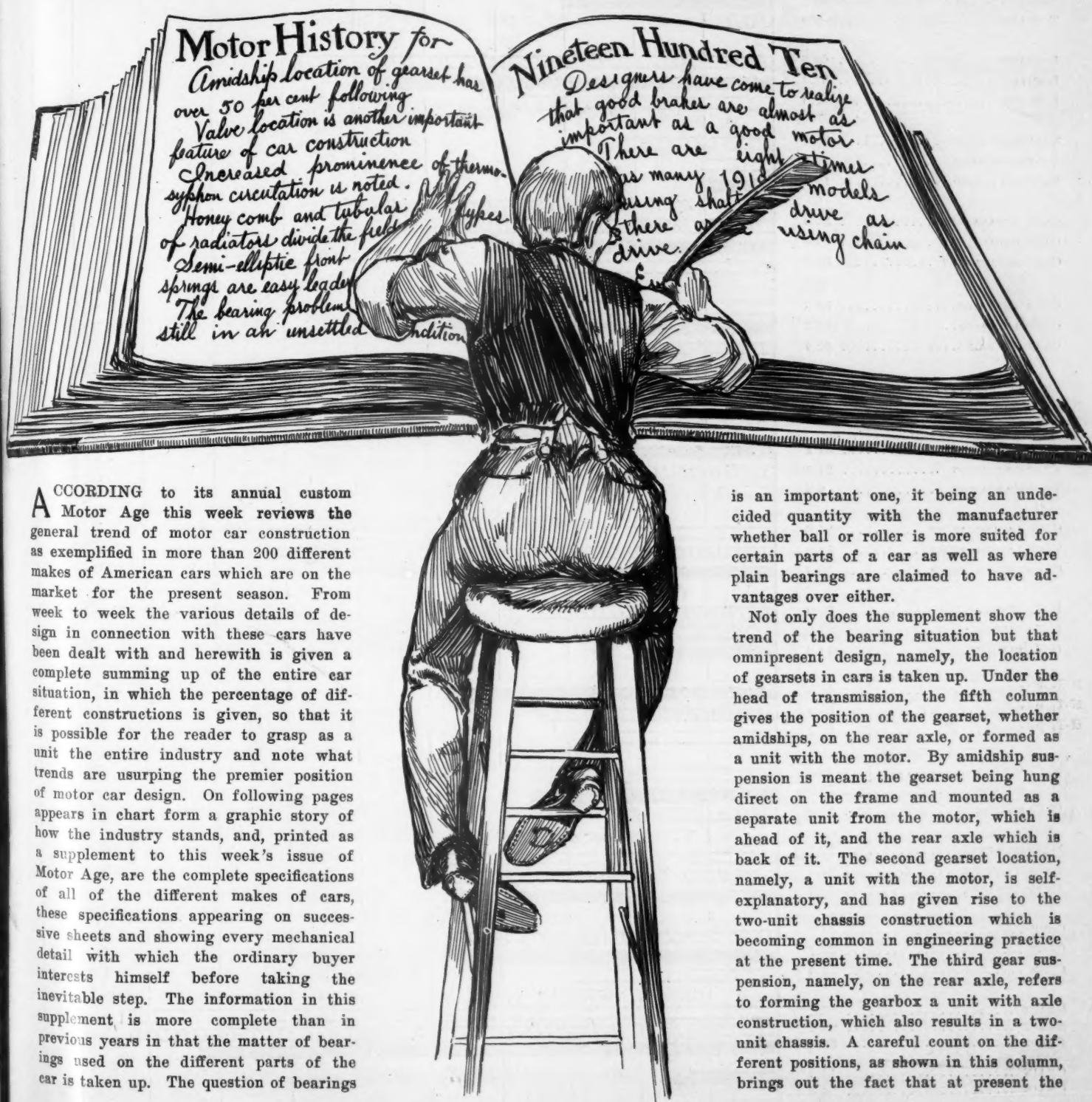


MOTOR AGE

MOTOR AGE REVIEWS CONSTRUCTION TREND

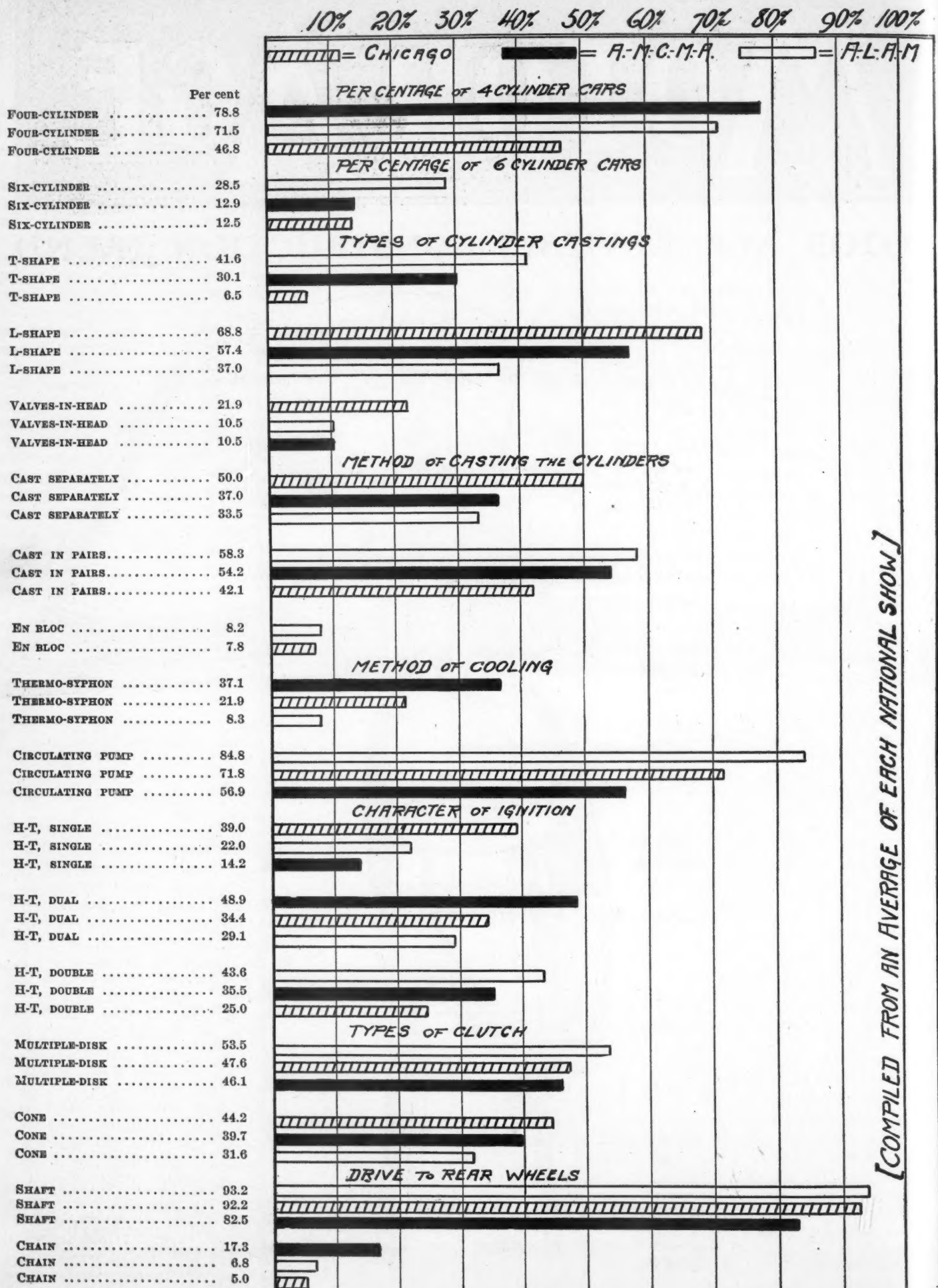


ACCORDING to its annual custom Motor Age this week reviews the general trend of motor car construction as exemplified in more than 200 different makes of American cars which are on the market for the present season. From week to week the various details of design in connection with these cars have been dealt with and herewith is given a complete summing up of the entire car situation, in which the percentage of different constructions is given, so that it is possible for the reader to grasp as a unit the entire industry and note what trends are usurping the premier position of motor car design. On following pages appears in chart form a graphic story of how the industry stands, and, printed as a supplement to this week's issue of Motor Age, are the complete specifications of all of the different makes of cars, these specifications appearing on successive sheets and showing every mechanical detail with which the ordinary buyer interests himself before taking the inevitable step. The information in this supplement is more complete than in previous years in that the matter of bearings used on the different parts of the car is taken up. The question of bearings

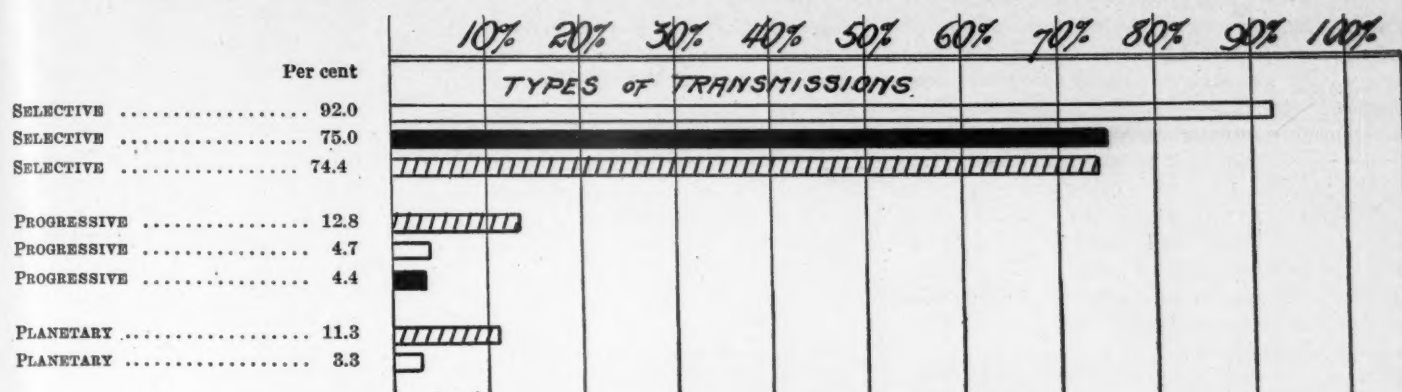
is an important one, it being an undecided quantity with the manufacturer whether ball or roller is more suited for certain parts of a car as well as where plain bearings are claimed to have advantages over either.

Not only does the supplement show the trend of the bearing situation but that omnipresent design, namely, the location of gearsets in cars is taken up. Under the head of transmission, the fifth column gives the position of the gearset, whether amidships, on the rear axle, or formed as a unit with the motor. By amidship suspension is meant the gearset being hung direct on the frame and mounted as a separate unit from the motor, which is ahead of it, and the rear axle which is back of it. The second gearset location, namely, a unit with the motor, is self-explanatory, and has given rise to the two-unit chassis construction which is becoming common in engineering practice at the present time. The third gear suspension, namely, on the rear axle, refers to forming the gearbox a unit with axle construction, which also results in a two-unit chassis. A careful count on the different positions, as shown in this column, brings out the fact that at present the

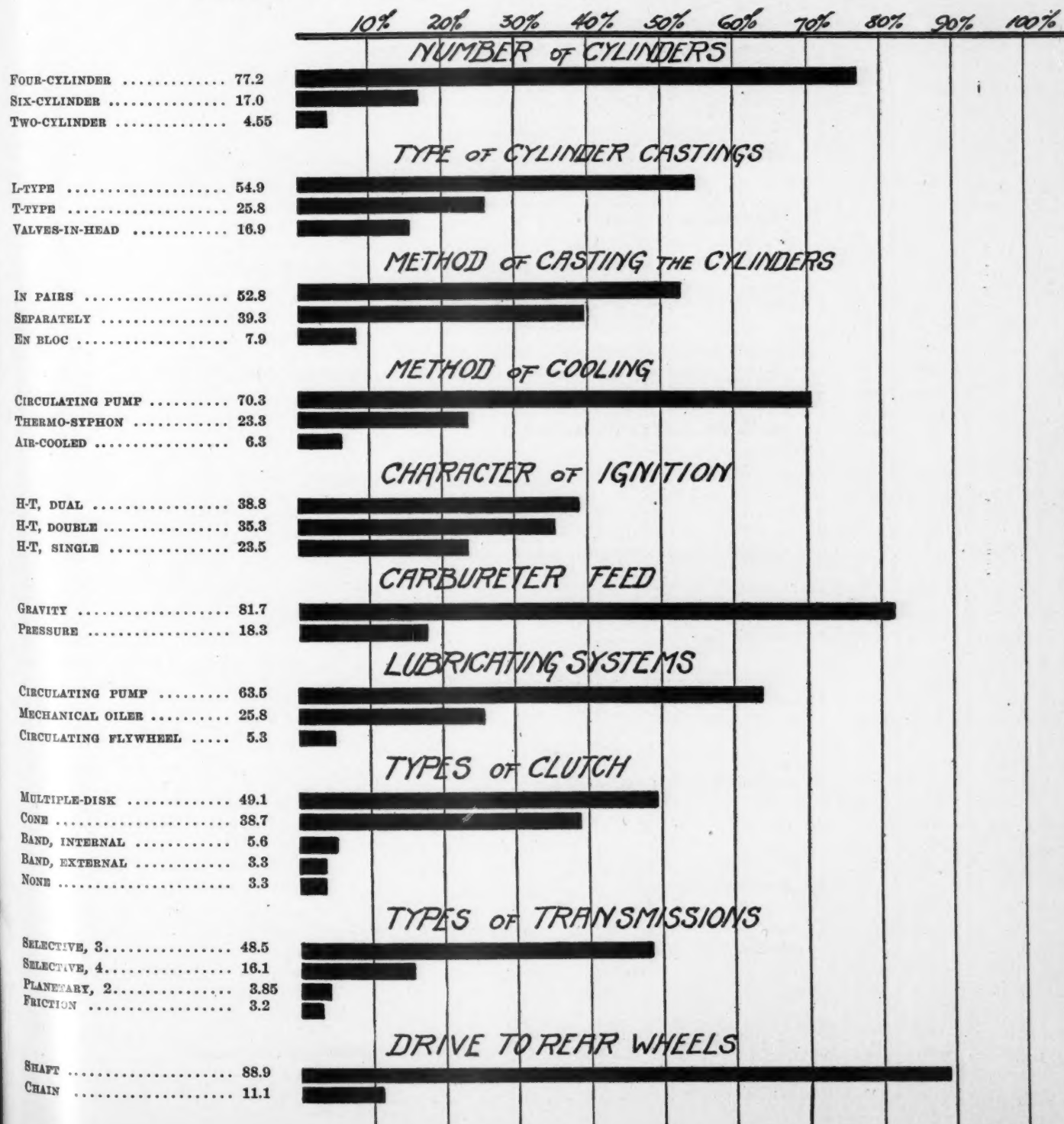
GRAPHIC COMPARISON OF CAR CONSTRUCTION



AT THE THREE NATIONAL SHOWS THIS YEAR



Trends as Evidenced in Complete American Output



Marylanders Amend Swan Bill

BALTIMORE, MD., March 19—The Swann motor vehicle bill will not go through the legislature without a number of amendments. The most important changes are made in the section providing that the speed regulations should be graded and that ordinances by towns, cities, villages or counties on this question should be subordinated. The amendment that the municipalities and other subdivisions of the state government should fix their own regulations was adopted. This amendment, however, provides that such regulations shall not be effective, however, unless printed prominently on signboards at the limits of the corporations in letters at least 4 inches high. Other amendments accepted were those striking out the clause whereby toll bridge and toll-pike companies were regulated in tolls for cars to a basis not higher than that charged for

two-horse teams; the taking of collections of all fees from the hands of the secretary of state and placing this in the hands of the motor car commissioner, who will create therefrom a road improvement and repair tax; that entitling owners to four sets of interchangeable distinguishing numbers and the one providing that persons under the age of 16 and over the age of 14 may operate cars after taking a special examination. An amendment to allow cars to show at the same time two sets of license numbers also was adopted. Senator Lee offered an amendment limiting to 2 days the time when cars of non-residents could be run in Maryland without license, but he withdrew it to allow Senator Linthicum to offer one providing for a special tax to be obtained from the motor car commission and good for use in Maryland for 1 week without the fee.

amidship location has over 50 per cent of the followers, with the remainder divided fairly evenly between those placing it on the rear axle and those forming it as a unit with the motor.

Still another important feature of car construction, brought out in this supplement, and not heretofore included, is valve location, namely whether the cylinder is of T construction, L type, or valve-in-the-head design. Actual percentages show that the L-type of piston is used on the majority of the cars selling at \$1,000. In cars selling in the \$1,500 field, the L type has 71 per cent of the total, the valve-in-the-head type 19 per cent and the T type 10 per cent. In cars listing about \$2,500, or thereabout, the L type has 67 per cent of the followers, the T type 8 per cent, and the valve-in-the-head type 25. Lastly, in the \$4,000-car field, the L type has 53 per cent, the T type 16 per cent, and the valve-in-the-head type 30 per cent. From this it will be observed that the number of followers of T-head construction increases in the bigger-car field; the followers of the valve-in-the-head type gaining in numbers as the top is approached.

Thermo-Syphon Circulation

A most interesting feature in connection with cars this year is the increased prominence of thermo-syphon circulation. At present 70.3 per cent of the entire output of cars continues using the circulating pump as the medium of water circulation throughout the cylinder jackets and radiators. After this comes the thermo-syphon system with 23.3 per cent to its credit, and lastly are air-coolers with a following of 6.3 per cent. It is quite remarkable to note that thermo-syphon has gained in followers so that it now occupies a one-to-three ratio with the pump system of circulation. On the other hand air-coolers have gradually reduced in percentage during the year.

Under the head of cooling, in the tabu-

lation contained in the supplement herewith, is a division on the type of radiator employed. In the early days of motoring the honeycomb radiator was in the lead. Following this came the rise in popularity of the tubular type of one class or another. Within the last year several of the higher-priced cars have adopted the honeycomb or cellular construction. Accurately speaking, the tubular radiator practically occupies the entire \$1,000 field. The honeycomb type has a 30 per cent following in the car which may be classed as a \$1,500 machine; it has a 47 per cent following in the \$2,500 division, and this rises to 70 per cent in the highest class of cars. This tendency is in direct accord with that which has taken place in Europe, where the honeycomb type has been popular since its introduction by the Mercedes company.

Spring Suspension

Referring in passing to the matter of spring suspension, it is of interest to know that, in perhaps no part of the running gear of a car, has more changes occurred than in the rear spring system. Two years ago the semi-elliptic rear spring controlled the field. The introduction of the platform type caused a two-sided warfare, the outcome of which was problematic and would have continued so had it not been for the introduction from Europe of the three-quarter type of spring for the year. A hurried glance down the fifth column of the running gear section in the tabulation shows the phenomenal increase the three-quarter spring has made during the last year. In fact, it has today to its credit 40 per cent of the followers in the big-car class, as compared with 30 per cent which prefers the semi-elliptic and 20 per cent which makes use of elliptics. But 10 per cent of the car builders in this division uses the platform spring. As we come to smaller-powered cars, the semi-elliptic gains, and the elliptic is a leader

with 75 per cent of the makers using it. The percentage employing the three-quarter is reduced to 13, and it is a coincidence that 13 per cent continues using the semi-elliptic.

Passing to a consideration of front springs it is at once apparent from the tabulation that the semi-elliptic is an easy leader; in fact, it has 100 per cent of the followers among big cars and its percentage is approximately 80 in the small-car division.

Problem of Bearings

As already stated the problem of bearings has been a much-mooted one during the last couple of seasons, and still is in an unsettled condition, although it is possible to trace a few trends along this line. In the matter of bearings employed on the front wheels which are given in the second column under the head of bearings in the supplement's tabulation, it appears that the Timken type of roller is making rapid gains in the big-car field. In the medium-powered car the ball bearings usurp the lead in a three-to-one ratio, and this ratio is practically continued in all lower-powered machines. In the case of the bearings used in the rear axle the same situation holds, excepting in that the percentage of roller bearings is not quite so high, which is partly explained by the fact that some manufacturers employ a combination system using roller bearings at the outer end of the axle and ball bearings for carrying the differential.

Before dismissing the bearing situation, the use of different types in the motor and other parts must be noted. On the crankshaft the plain type is everywhere in the lead, particularly in the high-powered field, although there are two or three makers at the present time who are fitting ball bearings on the crankshaft. Some manufacturers fit the ball bearings at the end of the shaft and plain bearings in the center. The question of bearings, particularly with high-powered cars, is of additional interest when the matter of the number used is a consideration. In the four-cylinder motor 50 per cent uses three bearings, and 40 per cent employ five. Where five bearings are used it is understood that the cylinders are separate castings. When a consideration of the lower-powered machines is entered into the matter of plain and ball bearings remains unaltered, excepting in that we have a few makers who fit ball bearings. One construction becoming popular is that in which two races of ball bearings are employed to carry the crankshaft, a construction which is particularly meritorious in the mono-bloc motor. With all four cylinders in one casting, it is a difficult problem to secure sufficient bearing surface for a three-bearing shaft, and have the motor in its smallest form. The use of two ball races has proven a happy solution of this situation.

A chassis study which would not refer to the brakes on a car would be incom-

ete in that designers have come to realize that good brakes are almost as important as a good motor, in fact one or two designers have been heard to remark that it is almost as difficult to design and manufacture a good system of brakes as it is a motor. In the early days of car construction brakes were sadly neglected, and it was only the prominence of the Glidden tour and the lessons learned from it that the brake situation received due attention at the hands of the engineers. The Motor Age supplement, in the first and second columns under the brake heading, shows the location of the two sets of brakes on all of the different motor cars, the presence of two sets being imperative because of city ordinances. These columns also show the location of both sets, the abbreviation R. W. meaning rear wheels. This is the common practice, namely, locating both sets on the rear wheels, where they are nearest the work of stopping the car. It will be noted that a few makers continue in placing the service brake on the transmission, or more properly speaking the gearbox. In some chain-driven cars the custom continues to place them on the jackshaft. The great trend in location has been to put both on the rear wheels; and when this is done one set is made to expand and the other to contract in application. There have been some makers of late who expand both sets, and in doing this two methods of design are followed. The first is to make the brake drum double width, and place the expanding shoes side by side. The other method is to have what might be designated a double drum, so that one drum is of greater diameter than the other, and arranged concentrically. The merit of having both sets expand is that a dust-proof construction is possible, which cannot be achieved where an external brake is used.

Lastly, in the running gear situation, comes the matter of shaft versus chain drive, which is included in the sixth column in the supplement tabulation under the transmission heading. A glance down this column shows that the shaft drive is master of the situation, in fact, to be accurate 88.9 per cent of the models specified in this tabulation makes use of shaft drive, as compared with 11.1 using chain. In other words there are eight times as many 1910 models using shaft drive as there are using chain drive.

Selective Gearsets Most Popular

The problem as to whether the selective or progressive gearset would eventually win out is also answered in the tabulation in the supplement. The column headed Type of Gearset shows that the selective has far outstripped the progressive; in fact, the progressive is a very small percentage of the whole list. There are all told 64 per cent using selective sets of one nature or another, 3 per cent using planetary, 3 per cent friction, and the remainder progressive design. In the se-

lective field the set giving three forward speeds is in the ascendancy, although the following of the four-speed design is not to be at all overlooked. Three or four of our biggest manufacturers, whether they are building four or six-cylinder cars, use a gearbox giving four forward variations. By actual count there are three times as many employing the three-speed set as there are using four-speed.

Perhaps the last phase of the transmission question, to which the reader's attention should be directed, in a study of the supplement, is the clutch situation. The days were when the cone clutch possessed premier honors, but that day is over, and now the multiple disk has usurped the field and has 49.1 per cent of the followers. The cone comes second with 38.7 percentage, the internal band third with 5.6, the external band fourth with 3.3, and in the remainder the clutch is eliminated due to the use of planetary or friction gearsets.

Continuing this study of the specifications of all American models to the motor not a few interesting phases present themselves. It will be in order to note the prominence of different cylinder designs. The four-cylinder type, which has held the center of the stage for the last 3 or 4 years, still occupies this enviable position, with the six-cylinder next in order, the two-cylinder in third place, and the single-cylinder fourth. There are followers of the three-cylinder, five-cylinder, and eight-cylinder design, but their percentage is so small as to be neglected in this review. In the four-cylinder category 77.2 per cent of the models is enrolled; 17 per cent is included in the six-cylinder division; 4.55 per cent in the two-cylinder class, and one-half of 1 per cent in the one-cylinder field. These figures show that the six-cylinder design is forging to the front at a conservative pace. When the six made its debut in America a landslide towards

it at the expense of the four was expected, but the high percentage of efficiency and flexibility in the four was such as to hold its admirers, which it is doing consistently at the present time. The six, however, is slowly gaining, particularly in the high-priced field.

The introduction of the magneto, as well as the invention of the dual-ignition system, has added a new interest to the ignition problem, and now there is grim warfare between the double and dual systems with the single type running in third place. The exact practice of each concern in this respect is shown in the supplement, the second column under the head Ignition showing the system fitted on each of the many models. All told, 38.8 per cent employs or fits the dual system, 35.3 per cent fits the double system and 23.5 per cent continues using the single system. It is surprising to note the progress in the dual type, but this is largely explained by the fact that this type requires but one set of spark plugs, whereas two sets and the timer or distributor are needed for the double system.

Lubricating and Gasoline Systems.

In concluding an analysis of the major phases of the car specifications, attention is drawn in passing to the lubricating and gasoline systems. Motor Age has reviewed separately the percentage of these systems, as exhibited on cars at the two New York shows and the Coliseum exposition in Chicago, and now in summing up the entire American field, it is noted that 63.5 per cent employs the circulating system, 25.8 has continued using the mechanical oiler, 5.3 uses a circulating system with a flywheel as the creator of the circulation, and there is a small percentage in which the pressure-feed oiler is used. In the matter of gasoline feed 81 per cent uses a gravity flow and the remainder feed by pressure, locating the gasoline as they do on the rear of the chassis.

Prepare for the Eastern Events

PHILADELPHIA, Pa., March 21—With winter officially scheduled to take a back seat today—and the weather clerk doing his share by furnishing an ideal Saturday and Sunday—local clubdom is brushing up for approaching contests on the road. Probably the most unique affair in this line will be the third annual roadability run of the Quaker City Motor Club to Atlantic City on Saturday, April 30.

Sanctioned by the A. A. A., indorsed by the Philadelphia Automobile Trade Association and with the board of trade and municipal authorities of Atlantic City as hosts, the entry list promises to far outclass in point of numbers that of last year, when seventy cars competed. The prize list has been made up on a sliding scale—a clever scheme evolved by Secretary Harry Harbach—and every car that completes

the route within the limit will win something, valued according to the nearness of its time to the official secret figures of Mayor Reyburn and Mayor Stoy, the chief executives of Philadelphia and Atlantic City. The cars will park on Young's Million-Dollar pier, where an impromptu show, free to the public, will be held.

The officials of the Norristown Automobile Club, whose entry list for its 2-day endurance run to Scranton and return, May 18-19, will be largely made up of Philadelphians, indignantly deny the statement that the club contemplates conducting that affair without the sanction of the A. A. A. There was a slight misunderstanding as to the make-up of the technical committee, but that has been amicably and satisfactorily adjusted, and there now is nothing to stand in the way of the usual big list of entries.



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Supplement This Week

MOTOR AGE draws the attention of its readers to the opening pages of this issue, in which the great trends of construction in car building for this year are commented upon, and chiefly to the six supplement sheets in which the entire specifications of practically all models built this year are given. These specifications are more exhaustive than ever before attempted and show at a glance the varied constructions of the many different makes of cars as well as the different models of the same manufacture. In addition to giving the general car specifications, the enumeration of the bearings used on the crankshaft, camshaft, clutch, gearset, front wheels, rear axle and steering gear serve as a guide in the general trend of bearing construction. It is only after taking the totals in the many types of bearings used that definite knowledge can be obtained, and this table supplies this.

IN this supplement all of the information was obtained direct from the factories, comprehensive tabulation sheets having been sent to each maker in order that no errors might occur. The enumeration of the horsepower, according to the A. L. A. M. formula, is new in tables of this nature and hand in hand with it, and of the greatest value, is the column showing piston displacement in cubic inches, this displacement being important owing to the classifying of cars at the present time for speed events according to the piston displacement. No effort has been made to give the horsepower of the different models as announced in the catalogs of this year because of the variable ratings given, some makers rating them 35 per cent lower than the formula rating and others by putting them 25 per cent higher than the formula. Where one maker adds to and the other takes from a definite standard of measurement there is not any possibility of making comparisons, and it is only with the object of placing all makes on an equality that this rating has been used in these specifications. Some makers will argue justly that they are not given an equal comparison with other makes by this formula rating, the reason being that owing to certain features of design their motors give more power than shown by this rating. There is justice in several cases in their arguments, and Motor Age can only say that the formula rating is better and much more just to all concerned than the catalog ratings and offers the present arrangement as the lesser of two evils.

THE compiling of this supplement tabulation has suggested many features that manufacturers could get together upon with the best advantage. One of these is the adoption of some general scheme of motor car nomenclature. After Motor Age received the individual specification sheets properly signed from the manufacturers, it was impossible in many cases to translate the meaning of the maker, a fact due to a lack of a clear understanding of many terms today used in conjunction with the motor car. One of the most confusing is magneto types, makers continuing to state they have a high-tension magneto when they have a low-tension one. It seems a small thing to grasp the difference between a high-tension and a low-tension magneto, yet there are over a score of manufacturers who apparently do not realize the difference, or if they do they do not wish to make it known. Another feature of construction equally often misnamed is the type of rear axle, the term floating being used when it has no right to be, and in some cases not used when it should be. A little co-operation among the makers would soon clear the atmosphere.

Once More a Victor

ONCE more has the motor car shown that it is the undisputed speed king of earth so far as human transportation is concerned, the mile last week in 27:33 by Barney Oldfield in his special Benz car being the fastest flight that any human being has ever made for that distance. For several years, in fact since the Stanley and Darracq machines set their records some years ago, it has been a matter of dispute whether the electric trolley car or the motor car held the premier honors, but last week put all arguments aside and now the motor car's performance is beyond dispute. This performance means much more to the motor world than simply honors to one driver and to one make of car; it means that the motor car so long as it remains the fastest means of human locomotion on earth, so long will it bask in the bright light of public admiration, and just so soon as some other vehicle of travel sets a higher pace just so soon will the motor car lose a little of its prestige and the industry will be a sufferer to that extent.

THE present-day public is an easy one to entertain and that same public is the jury that passes upon the great turning points of different industries, particularly any industry such as the motor car, which is primarily concerned with the transportation of the public. It would be an injury to the motor business of today if the aeroplane were to travel at a speed of 135 miles an hour and so take the record away from the car, for just so soon as such took place the public would flock to the aerial wonder; but so long as the motor car stands as the fastest construction in existence so long will the eyes of the public feast upon it and so long will the manufacturer and dealer benefit as a direct result of its prowess. From this it is imperative on the makers of cars to keep before the spot light of public admiration. The world loves a winner, and so long as the motor car remains the fastest so long will the world love it, follow after it and unconsciously aid it financially.

ON another page of this issue is given a general summing up of the new rules to govern reliability contests during this season. An analysis of these rules show that they differ in very many respects from the rules adopted last year, and in nearly every case it would appear that the changes are for the better. One most important change is the adoption of four classes of reliability runs which should meet with the varied requirements of the scores of clubs scattered throughout the country. The small club that wants only a time schedule has it, the more fastidious type can enjoy the time-and-work penalty scheme, and lastly the gilt-edged reliability run for a week or more is looked after. Most important in the rules is the option given on the conducting of tests for tires. Last year many makers wanted tire tests as a part of the big runs. For this year the tire test is not imperative, but it can be made a factor of every contest. The rules go still further and allow of penalizing accessories in runs if the promoters so desire, the penalty on these accessories not counting in any way against the performance of the car. Last year certain accessory parts were penalized against the car and the result was not looked upon with favor by many makers, it being claimed by them that they were not responsible for the fittings; that reliability runs were for the purpose of trying out motor cars and not for the purpose of testing the durability of the accessories that are used on them.

STATE OF NEW JERSEY FROWNS ON MOTORISTS

PHILADELPHIA, Pa., March 21—Motorists in the states adjacent to New Jersey, who spend much time—and money—in the Garden state during the spring, summer and early fall, are much annoyed over the defeat of the Edge bill in the senate last week. The measure had such easy sailing in the house that all hands naturally looked for an equally speedy passage in the senate; but Senator Frelinghuysen, the sponsor of the present law, and one or two of his confreres, put a spoke in the wheel of the advocates of the bill, saying that the New Jersey motorists did not want it, even though the Automobile Club of America and the numerous Pennsylvania clubs did.

They could see no reason why the foreign motorists should not continue to pay the largest share of the expense of keeping the roads in shape. Both the state motor vehicle department and the state department of roads were against the measure, said Senator Frelinghuysen; he objected to the repeal of the 5-day license mainly, however, on the ground that it would immensely increase the difficulty of identifying those who abused the tourist privilege. It has been figured out that the passage of the Edge bill would have saved each Pennsylvania owner \$14—\$10 for himself and \$4 for his chauffeur. Although one of the five who voted for the measure—Wilson, of Atlantic—changed his vote in the hope of securing later reconsideration, the one-sidedness of the balloting would seem to preclude any resurrecting the Edge bill.

But that is not the worst of it, for on Wednesday last a bill was introduced into the senate providing for an all-around increase in license fees. The measure would make the fee for a car of 10 horsepower or less, \$3; 14 to 15 horsepower, \$5; 16 to 20 horsepower, \$10; 21 to 24 horsepower, \$15; 25 to 39 horsepower, \$20; 40 horsepower and over, \$25. There seems to be a studied effort on the part of someone to keep the spenders away from the numerous coast resorts. It will be recalled that before the Frelinghuysen law went into effect the stringency of the New Jersey laws was sufficient to induce the Glidden tour managers to change their route so as to avoid that state entirely. If foreign owners are compelled to pay the amounts scheduled by the new bill or stay off the sacred soil of Jersey, they may choose the latter.

DETROIT POLICE AROUSED

Detroit, Mich., March 21—Police Commissioner Croul announces that, beginning today, he will institute a campaign for the strict enforcement of the motor law passed by the last legislature and the local traffic regulations with regard to motor cars. Between 500 and 700 motorists in this city, it is estimated, have failed to re-register their machines under the new law. The commissioner declares

Defeat of Edge Bill Regretted by Progressive People—Registration Rates May Be Raised

that the owners of all machines appearing in the streets hereafter without a 1910 license plate, issued by the secretary of state, will be complained against. He has enlisted the aid of the Detroit Motor Club in securing evidence against offenders.

Failure on the part of car owners to secure new licenses has resulted in considerable confusion of late. In some instances it has been found that the same numbers displayed on Detroit machines are being carried by machines in other cities in the state, the latter of course being of more recent issue. Some of the owners have tried to excuse themselves by saying that the delay in securing the 1910 license plates was the fault of the

secretary of state. Commissioner Croul took the trouble to investigate and learned that in no case have more than 3 days elapsed between the filing of the application and the forwarding of the license. This excuse, therefore, will not go now.

Under the new law chauffeurs who drive machines for hire are required to display a badge, but many of them have failed to comply. Under the traffic ordinance every driver is required, before making a turn, to warn other vehicles as to which direction he intends to take by a wave of the head. This rule has not been generally observed heretofore, but it will be in the future or Mr. Croul will know the reason why. Ample time has been allowed by the department for compliance with the new regulations, and the period of grace has expired.

Reference has been made to the fact that the Detroit Motor Club will co-operate with the police in enforcing the motor laws. This means more now than it would have a few months ago, for the club is fast becoming a factor to be reckoned with in local car circles. Only recently it was granted membership in the A. A. A., and the announcement has given the organization new life. An earnest effort is being made to increase the membership to 1,000 within the next month. Offices have been opened in the Hotel Cadillac, and electric signs placed outside the building announcing the location. The officers are: President, Joseph S. Stringham; vice-president, John S. Haggerty; secretary, John Gillespie; treasurer, George E. Lawson.

BAY STATE LAW PROFITABLE

Boston, Mass., March 19—Some idea of how the new motor law is throwing a stream of revenue into the state treasury may be gleaned when it is known that with 3 months not yet passed the money so far received by the state from motor cars is within a few thousand of the entire receipts of 1909. Last year the state received \$169,973.54 from the motor department. With two weeks more to run before March ends this total will be exceeded, for all that is needed is less than \$4,000. In 1 week this month the registrations brought in more than \$13,000, so it is easy to see how big the sum will grow under the new law. The coming of good weather is one reason responsible for so many more machines being registered at this time than was the case a year ago. Then again there were hundreds of new machines delivered late in 1909 and many of the owners have registered them early. While but 9,100 were registered up to the middle of March last year the figures now are above 13,000. There is an increase all along the line in renewals of licenses, operators, dealers, chauffeurs, etc., all of which is bringing in money to the state.

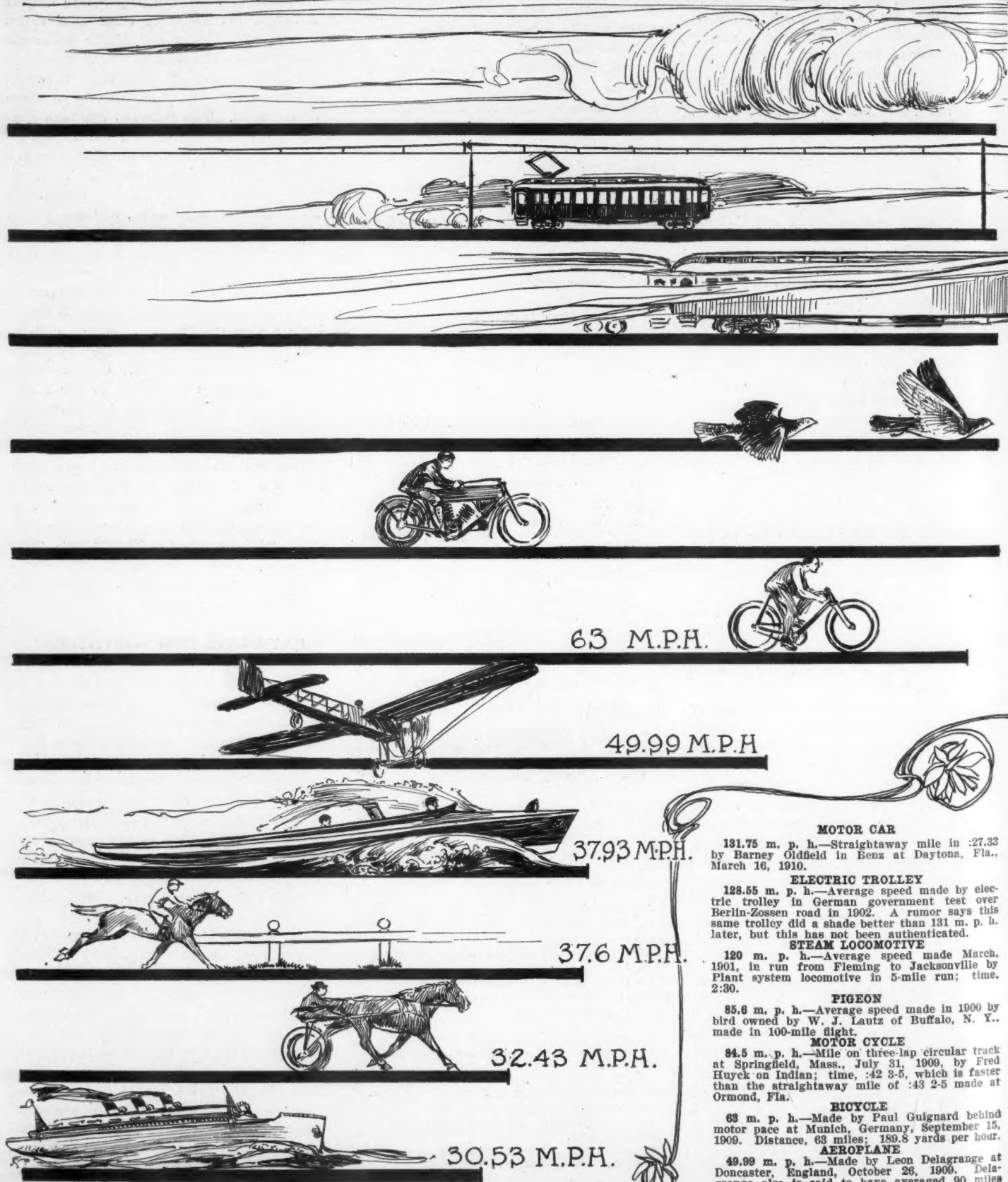
Death of George N. Pierce

Buffalo, N. Y., March 24—Special telegram—George N. Pierce, former president of the George N. Pierce company, now the Pierce-Arrow Motor Co., died in his apartments at the Lenox hotel in this city last night. For the last 2 years Mr. Pierce had been suffering from heart trouble, which caused his retirement from the Pierce company's presidency. He was succeeded by George K. Birge, the present incumbent. Mr. Pierce was about 65 years of age and established the George N. Pierce company in 1865, making hardware specialties. In the '90s he started manufacturing bicycles and in 1900 he began the manufacture of Pierce-Arrow motor cars.

Coming Motor Events

- March 26—Hill-climb at Atlanta, Ga.
- March 26-April 2—Automobile Dealers' Association of Pittsburg show, at Pittsburg, Pa.
- March 26-April 2—Show at Montreal, Canada.
- March 28-April 2—Show at Indianapolis, Ind.
- March 28-29—Savannah, Ga.—Jacksonville, Fla., endurance run, Savannah Automobile Club.
- April 7-9—First annual show at Davenport, Ia.
- April 8-10 and 13-17—Opening meets at new board motordrome, Los Angeles, Cal.
- April 23-29—Second annual show at Bangor, Me.
- April 30-May 2—Reliability run to Atlantic City, Quaker City Motor Club of Philadelphia, Pa.
- May 2—Start of flag-to-flag endurance run from Denver, Colo., to the City of Mexico.
- May 9—Road Race at Santa Rosa, Cal.
- May 29—Spanish volturette road race for Catalunya cup.
- May 30—Decoration day road race of Denver Motor Club, Denver, Colo.
- May 30—Annual hill-climb at Bridgeport, Conn.

Comparative Speed Table



MOTOR CAR

131.75 m. p. h.—Straightaway mile in :27.33 by Barney Oldfield in Benz at Daytona, Fla., March 16, 1910.

ELECTRIC TROLLEY

128.55 m. p. h.—Average speed made by electric trolley in German government test over Berlin-Zossen road in 1902. A rumor says this same trolley did a shade better than 131 m. p. h. later, but this has not been authenticated.

STEAM LOCOMOTIVE

120 m. p. h.—Average speed made March, 1901, in run from Fleming to Jacksonville by Plant system locomotive in 5-mile run; time, 2:30.

PIGEON

85.6 m. p. h.—Average speed made in 1900 by bird owned by W. J. Lantz of Buffalo, N. Y., made in 100-mile flight.

MOTOR CYCLE

84.5 m. p. h.—Mile on three-lap circular track at Springfield, Mass., July 31, 1909, by Fred Huxley on Indian; time, :42 3-5, which is faster than the straightaway mile of :43 2-5 made at Ormond, Fla.

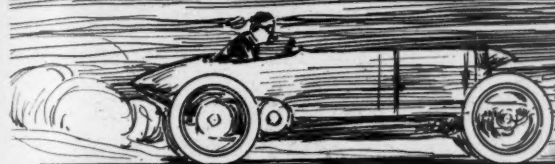
BICYCLE

63 m. p. h.—Made by Paul Guignard behind motor pace at Munich, Germany, September 15, 1909. Distance, 63 miles; 189.8 yards per hour.

AEROPLANE

49.99 m. p. h.—Made by Leon Delagrangé at Doncaster, England, October 28, 1906. Delagrangé also is said to have averaged 90 miles

Shows Supremacy of Motor Car



131.75 M.P.H.



128.55 M.P.H.



120. M.P.H.



85.6 M.P.H.

84.5 M.P.H.



30.37 MPH



27.19 M.P.H.



14.20 M.P.H.



12.77 M.P.H.



9.11 M.P.H.



2.65 M.P.H.

per hour at Blackpool, but record was not accepted because of having been made during heavy gale.

MOTOR BOAT

37.93 m. p. h.—Average speed made by Dixie II. over 30-knot course on Hudson river, September 17, 1906.

RUNNING HORSE

37.6 m. p. h.—Straightaway mile in 1:35½ by Salvator at Monmouth park, New York, August 28, 1890.

PACING HORSE

32.43 m. p. h.—Mile time trial in 1:55 by Dan Patch at St. Paul, September 8, 1906.

STEAMSHIP

30.53 m. p. h.—Average made in fastest day's run of Mauretania, covering 673 knots, in June, 1909.

TROTting HORSE

30.37 m. p. h.—Mile time trial in 1:58½ by Lou Dillon at Memphis, Tenn., October 24, 1905.

SKATER

27.19 m. p. h.—Mile in 2:12 3-5 by Tim Donoghue, February, 1887.

RUNNING MAN

14.20 m. p. h.—Mile in 4:12½ by W. G. George, made in 1886.

ROWING

12.77 m. p. h.—Average made in 4-mile race by Oxford crew in 1893, and Cambridge in 1900; time, 18:47.

PEDESTRIAN

9.11 m. p. h.—Mile in 6:23 made by W. Per-
tins in 1874.

SWIMMER

2.65 m. p. h.—Mile in 23:16 4-5 by B. Kieran of Australia.

OLDFIELD GOES FASTER STILL—132.04 M. P. H.

**Benz Does Flying Kilometer
In :27.04 and 2 miles In
:55.8—Knox's Mile Effort
:40.65—Stock Car Record**

DAYTONA, FLA., March 23—Special telegram—Once more the average pace record has been bettered and again the hero is Barney Oldfield in the Benz, who this afternoon succeeded in covering the flying kilometer at the rate of 132.04 miles per hour, which excels the 131.75 miles made a week ago today when Oldfield covered the flying mile in :27.33. His time for the kilometer today was :17.04 and the mark he shattered was the :17.76—126.1 miles per hour—made on the Brooklands track in England by Hemery. The American previous best was much slower—:18.4, made by Marriott in the Stanley steamer in 1906.

Other Records Broken

Other records were broken today, but they were eclipsed by the kilometer, which took the wind out of the sails even of the famous 2-mile-a-minute race. In this Oldfield succeeded in smashing the Demogeot :58 $\frac{4}{5}$, cutting it to :55.87, which is at the rate of 128.88 miles per hour.

Oldfield then demonstrated what he could do with an American car by attacking the stock car mile record in his Knox six in which he succeeded in doing :40.35, or 88.5 miles per hour. The only comparison to be had is furnished by the straightaway trials run at Lowell, Mass., last September, when the fastest stock mile was made in :44.1 by Lytle in the Apperson. The best mile at Lowell was :39.9 by Oldfield in the Benz he had before he got his record-breaker.

These record trials originally had been set for yesterday, when the annual beach meet opened, but before the card got that far the tide was so high that the attempts had to be called off. There were only three events run. The 10-mile southern championship was won by Hotchkiss in a Pope-Hartford in 9:27, defeating Bond in a Stearns. The 20-mile-free-for-all stock chassis race was taken by Oldfield in a Knox six, his time being 18:00.6, Hotchkiss in the Pope and Ormesdorf in a Chalmers finishing after him. A 10-mile handicap saw a Chalmers 40 in first, a Chalmers 30 second and a Hudson third. No time was taken. There were several exhibitions by Oldfield, Christie and Bruce-Brown, but no time was taken.

Mile Trials Interesting

The record attempts today occupied most of the time, but still there were other events of interest, chief of which were the 1-mile time trials which Oldfield won but in much slower time than last week—slower by $\frac{1}{5}$ second than the Marriott mark of



SIDE VIEW OF NEW MARMION RACER WITH WIND-RESISTING BODY



SIDE VIEW OF BENZ MOTOR USED BY OLDFIELD AT DAYTONA

:28 $\frac{1}{5}$. Robertson in the Christie put up a really great mile when he did :30.39. Following this Oldfield made the Knox drive and then came the 10-mile Florida championship which resulted just as did the same race yesterday—Hotchkiss in a Pope first and Bond in a Stearns second. The time was faster, however—9:00.41.

Benz' Mechanical Features

The big Benz in which Oldfield has smashed the records is an object of curiosity to motorists who are at the beach and who have eagerly examined the mechanical features of the German machine. They have found that the four-cylinder motor has a bore of 7.2835 inches and a stroke of 7.8741 inches, while the cylinders are cast in pairs. The overhead valves are located on opposite sides and there is only one camshaft which is on the right side. Two magnetos are used with a complete ignition system for each, there being one spark plug in each cylinder in each system, making eight plugs in all. Lubrication is by splash feed in the crankcase and by a hand pump, while the cooling scheme con-

sists of a Benz radiator system and gear-pump. There are four speeds with direct drive on high, while the wheels are 32 by 4 inches in front and 34 by 5 inches in the rear. The wheelbase is 108 inches.

OHIOANS HOLD STATE MEETING

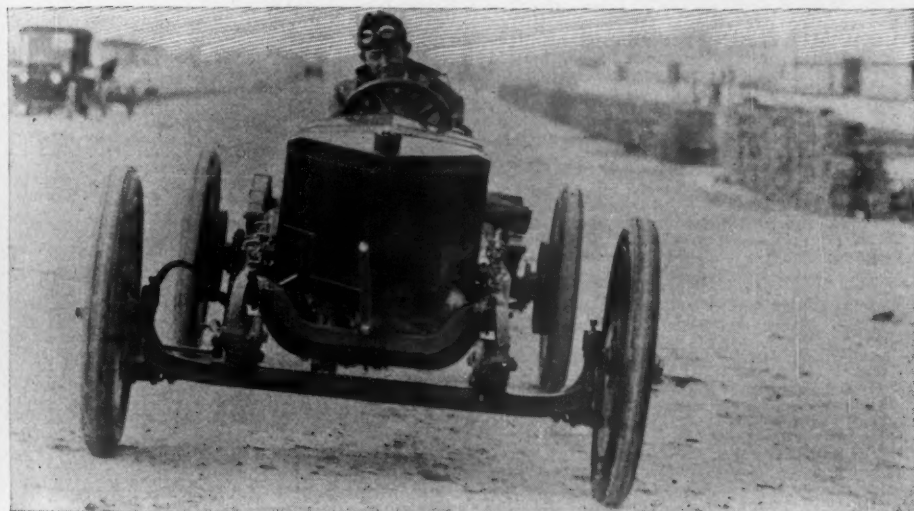
Columbus, O., March 21—Several important amendments were made to the constitution and by-laws of the Ohio State Automobile Association at the annual meeting held Wednesday. One of the important changes was an amendment changing the word "shall" to "may," in the section providing that the association shall become a member of the A. A. A.

Harry L. Vail was re-elected president for the coming year; A. B. Heyl, secretary, and C. L. Colter, treasurer. Perin B. Monypeny, of Columbus, was elected first vice-president; James A. Allen, of Kenton, second vice-president, and Cyrus E. Mead, of Dayton, third vice-president. Since the last meeting three clubs have joined the association, which now has a total individual membership of 1,773.

RENEWED ACTIVITY ON THE MOTOR PARKWAY



PARKWAY NEAR LAKE RONKONKOMA—READY FOR GRADING GANG



FRONT VIEW OF MARMON YELLOW JACKET RACER

NEW YORK, March 21—The return of spring witnesses renewed activity along the Long Island motor parkway. New construction from Bethpage Lodge to Lake Ronkonkoma has been going on during the entire winter. Clearing, grading and blasting have prepared the way for a road surface which will be thrown open for public use by the first of September. The section completed during 1909 from Great Neck to the Meadow Brook lodge is being surfaced with an improved type of tarred or bituminous macadam.

In constructing this section of about 10 miles, no fewer than ten highways were crossed, either above or below grade. An entrance on the Jericho turnpike, a short distance east of Krug's hotel in Mineola, will prove popular with the thousands of motorists. In Garden City, about ½ mile east of the Garden City hotel, there will be an entrance lodge. At Ronkonkoma lake there is to be erected during the present summer an inn or club which will be erected on an eminence commanding a view of the lake with many attractive features. Beginning with April 1 the

parkway will be open daily. A season of unusual activity is planned, including the Vanderbilt cup, the Grand Prize cup, the international aviation meet, a contest closed to members of the New York stock exchange, the challenge endurance contest between teams from the Long Island Automobile Club and the Crescent Athletic Club, and a series of match races, each affording interest to lovers of speed contests.

FAST TIME ON COAST

Los Angeles, Cal., March 18—That the new mile board track is speedy has been demonstrated by the workouts of some of the drivers already who are camped here awaiting the opening meet. The small cars especially have made remarkably good time, even though the track is incomplete, permitting only ¼-mile tests. Ray Harroun in a 32-horsepower Marmon, is reported to have covered the half in :22 flat, a rate of 82 miles an hour, while the Buick is said to have done the same distance in :23. It is doubtful if de Palma and Oldfield meet in their match because it is

New Construction From Bethpage Lodge to Lake Ronkonkoma—Fast Time on New Board Track at Los Angeles

hardly thought it will be possible to procure a new piston for the big Fiat in time. However, a battle between Robertson in his new Simplex and de Palma in the Fiat Cyclone is promised.

Harroun has not as yet received his new racing car, but photographs which have been sent on from the factory at Indianapolis show that so far as body lines are concerned it is a radical departure from the conventional. The new Marmon Hornet is said to be the first gasoline car built to comply with the new racing rules for division C having limited piston displacement regardless of weight. The body is built along the new lines of wind resistance, and the car is eligible to compete in the 451-600 class. It has a six-cylinder motor and is fitted with disk wheels, pointed radiators and pointed sterns.

TOUR FOR E-M-F OWNERS

New York, March 21—A motor tour of the White mountains and New England coast resorts is on the tapis for the coming summer. It will be an outing exclusively for owners and drivers of E-M-F cars. George C. John, the New York E-M-F agent, is the promotor of the tour. The route will cover the New England states as far north as Maine. The White mountain and Rangeley lake country will be made stopping points. A week will be spent in each section and special accommodations and rates will be provided for entrants. The run will be started early enough to enable the tourists to take advantage of the fishing season at the Rangeley lakes. In the White mountains the tour will follow the road leading to Gorham, thence to Jefferson highlands. Leaving the highlands, an easy run will be made to Mount Washington, where the members of the party will be conducted up the mountain to the summer house, where a day and a night will be spent enjoying the sublime view at an altitude of 6,500 feet. After a trip through the Glen Ellis valley, the tourists will head for the Crawford Notch. Upon reaching Conway the cars will make for Plymouth, where the tour will follow the Pemigewasset to Profile Notch and past the Old Man of the Mountain. Littleton will be made a night stop, and next day the cars will be piloted to Portland on the Maine coast. At Portland 3 days will be used in visiting the island resorts in the waters of Casco bay. Old Orchard, Kennebunkport, York Beach and Newburyport will be passed through on the way to Boston, and New York will be reached by the tourists in time for supper.

Reliability Run Rules Are Out

NEW YORK, March 22—The reliability rules, which will govern contests for the coming season, have been announced by the contest board of the American Automobile Association. The most important change in these rules, as compared with previous seasons, is that there now are four grades of contests, and that a scale of fixed penalties for breakage or repairs in connection with these contests has been arranged. The rules call for penalizing cars for late arrival at controls or checking stations, penalizing them for work or replacements done on the road, and also penalizing them for parts broken, loose, or damaged at the end of a run. The rules also take into consideration testing of the brakes at the end of the contest, testing of the clutch, gearset, motors, axles and springs. The four grades of tests are as follows:

Grade 1—A contest not exceeding 6 days in duration, with penalties for time, road work, final operative test and final technical examination.

Grade 2—A contest of more than 6 days duration, with penalties for time, road work, final operative test and final technical examination except that carburetor and brake adjustments may be made without penalty and spark plugs may be changed.

Grade 3—A contest of any duration in which penalties are imposed for time and road work only, but in which the final operative test and final technical examination are omitted.

Grade 4—A contest of any duration in which penalties are imposed for time only.

Four Grades of Contests

Grade 1 is the highest class of reliability contests and is the grade that will naturally be used by all organizations promoting a 3 or 4-day test. It will be noted that it does not permit of either carburetor or brake adjustment from start to finish of the run. On the other hand, a grade 2 contest is intended for long-distance tours, and allows for adjustment of the brakes and carburetors, otherwise it is as strenuous as grade 1. Grade 3 is an easy contest for clubs which do not care to go into the intricacies of grade 1, and only are desirous of penalizing for being late when arriving at controls or having to do work on cars on the road. The last one, or grade 4, allows every latitude and will cover every form of test in which a time schedule is the only consideration.

Another most important change in these rules is the introduction of non-stop runs, which will take the place of the perfect-score performances of other years. The non-stop run is described as a run without an involuntary stop of the car outside of controls, except for tire trouble or on account of traffic congestion. The motor must be kept running continuously while outside of controls. The car may be brought to a standstill at any time, no work being done, and the motor kept running. Stops for tire repairs or replacements with the motor kept running, are permissible. Non-stop certificates may be issued to contesting cars in grades 1 and 2 who conform to the requirements of the

non-stop definition in a contest exceeding 1,000 miles in length.

Classification of Penalties

The various penalties imposed in any reliability run have always proven of the greatest interest and this year every attention has been given to the best gradation of penalties for lateness, work done, and tests given cars at the end of runs.

To determine the operating condition of a car at the conclusion of a contest, tests of brakes, clutch, transmission and motor are provided for, with suitable penalties for defective operation. The following is a summary of penalties:

TIME

One point per minute, or fraction thereof, late in arrival at any control or checking station.

WORK

One point per man per minute, or fraction thereof, for labor by driver or passengers.

Two points per man per minute, or fraction thereof, for labor by workmen other than driver or passengers.

Two points per man per minute, or fraction thereof, for replacement of damaged parts by driver or passengers.

Four points per man per minute, or fraction thereof, for replacement by workmen other than driver or passengers.

Three points per occurrence for replenishing gasoline, oil or water, outside of fuel controls.

One point per minute, or fraction thereof, for motor stop when no work is done. No penalty for motor stop during period when work is being done on car, for which work or replacement a penalty is imposed.

FINAL OUTDOOR OPERATIVE TESTS

Brake Penalties—50 feet perfect; for each foot, or fraction thereof, over this distance, 1 point.

Clutch—5 points for failure to climb curbs, spin rear wheels or stall motor.

Gearset—25 points for failure to drive on any forward speed or reverse.

Motor Test—5 points for each cylinder not firing.

Front and Rear Axles—No penalty for ¼ inch spread between wheels; 5 points for each additional ¼ inch, or fraction thereof.

Springs—No penalty for sag of 1 inch; 5 points for each additional ½ inch, or fraction thereof.

FINAL EXAMINATION PENALTY

At the close of the contest, each competing car, after being properly washed, shall be delivered to the technical committee, which shall record all adjustments, replacements or repairs necessary to place each car in a safe and satisfactory condition, and penalties therefor shall be imposed in accordance with the following fixed penalty schedule:

LUBRICATION

Broken oil feed.....	3
Inoperative oil feed.....	3
Leaky oil connection.....	1
Loose oiler.....	3
Disabled oiler.....	20
Lost grease cup.....	2
Loose grease cup.....	1

CARBURATION

Broken gasoline line.....	2
Leaky gasoline line.....	1
Leaky gasoline tank.....	1
Leaky gasoline petcock.....	1
Disabled throttle control.....	15
Broken or loose manifold.....	15

BRAKES

Broken operating devices.....	100
Broken brake.....	100
Loose operating devices.....	25

RUNNING GEAR

Broken spring leaves, each.....	5
Broken spring clips, each.....	15
Broken spring seating.....	15
Loose spring clip.....	1
Loose spring horn.....	15
Broken frame side member.....	500
Broken frame cross member.....	150
Bent frame pieces.....	75
Broken strut rods.....	25
Broken torsion rod.....	25
Lost muffler.....	5
Broken muffler.....	3
Loose muffler.....	2

Broken wheel.....	100
Loose wheel spoke.....	5
Broken wheel spoke.....	10
Broken running board.....	6
Broken fender iron.....	6
Broken fender.....	5
Loose fender.....	2
Lost mud apron.....	8
Broken mud apron.....	5
Broken rear axle.....	300

COOLING

Leaky water connection.....	1
Leaky radiator.....	20
Loose radiator.....	4
Disabled water pump.....	15
Inoperative fan.....	2
Leaky waterpocket.....	50
Fan belt off.....	1

IGNITION

Loose terminal.....	1
Broken terminal.....	2
Dead battery.....	2
Lost commutator cover.....	2
Disabled commutator.....	20
Inoperative ignition control.....	5
Disabled magneto.....	20
Loose magneto.....	4

STEERING

Broken tie rod or drag link.....	200
Bent tie rod or drag link.....	25
Broken steering rod.....	200
Bent steering rod.....	25
Faulty steering gear.....	200
Loose steering connections.....	15
Broken steering knuckle.....	150
Bent steering knuckle.....	15
Broken front axle.....	300

MACHINERY PARTS

Broken valve.....	5
Broken or impaired valve spring.....	2
Broken cam.....	500
Broken camshaft.....	200
Broken crankshaft.....	500
Bent crankshaft.....	250
Broken valve rocker arm.....	10
Broken push or valve lift arm.....	10
Broken transmissionshaft.....	100
Broken cardanshaft.....	100
Broken driving chain.....	30
Broken gear or pinion.....	25
Broken bearings.....	10
Broken body or chassis bolts.....	2
Loose body or chassis bolts.....	1
Lost body or chassis bolts.....	2
Broken clutch.....	250
Broken or impaired universal joint.....	50
Broken or lost bonnet fastener.....	2
Loose bonnet fasteners.....	1
Broken or impaired springs.....	5
Broken shock absorbers.....	5
Loose shock absorbers.....	2

STEAM

Leaky condenser.....	20
Leaky generator.....	50
Faulty thermostat.....	20
Faulty pilot light.....	20
Faulty flow motor.....	20
Faulty gauge.....	5
Steam leak in line.....	1
Water leak in line.....	1

In cases of leaky radiator or waterjackets, recognition must be taken of the degree of leakage and the amount of fixed penalty modified accordingly.

Other Points Considered

In these rules points covering various details have been given every attention. The rules provide for observers on every car, a fixed running schedule of 16, 18 and 20 miles per hour for the different classes, lubricating of the cars, sealing of car parts, and incorporating rules for tire tests, accessory penalties, and economy features if desired. Just what equipment a stock car may or may not carry in reliability contests is very clearly laid down. It may carry special mud aprons in front of radiator or bonnet screens between the side members of the frame; rubber bumpers for springs, and rebound straps; tire-inflating tanks. It may not have special springs or spring windings; shock absorbers may not be added unless part of regular equipment, and covers over coil boxes, magnetos or any other part of mechanism, or screens around carburetor, are not permitted unless part of regular equipment. Tools are carried in a special bag and

sealed, the observers only having access to same.

Parts carried are inventoried, officially checked and sealed. There shall be no penalty for tire repairs, provided the engine be kept running while the repairs are being made and no other work is done. The time consumed in making the repairs, while the engine is running, shall be added to the day's running time. At noon or night controls, tanks for lubrication oil, gasoline and water may be filled without penalty. For replenishments of oil, gasoline or water at any other places the penalty is 3 points for each occurrence. Oil or grease may be added to or may be drawn off the various cases when necessary without penalty during the ½ hour allowed for oiling at the end of each day's run. Recharging of batteries will be allowed at any time, but all work in connection therewith must be done in the presence of the observer.

To enable an observer to keep a more accurate record of work done on a car, metal and wire seals will be affixed to the bonnet, coil box, transmission case, differential case, mud pan or apron and parts of ignition system not protected by bonnet seals and any other parts, as may be necessary. There will be no penalty for breaking a seal, which will be replaced at the official garage at the end of a day's run, but the observer will note the seal broken and must report how many times thereafter access was had to the part or parts protected by such seal. Thirty minutes are allowed at the end of each day's run for proper lubrication of the car in the official garage, seals being broken for this purpose and replaced.

Duties of Observers

The rules concerning observers have been broadened and strengthened and the duties of observers enumerated in greater detail than heretofore, the following rule among others having been added:

Observers must not interpret rules for entrants or drivers and cannot say what work may or may not be done without danger of penalization, their duties being solely to record what is done and the exact length of time consumed in doing it.

To induce entrants, who appoint observers, to use the greatest care in their selection, the following penalty is imposed on an entrant for the act of the observer he has appointed:

If an official observer shall desert a disabled car without first obtaining the driver's signature to a statement that he has withdrawn from the contest the entrant who appointed such observer shall be disqualified and must either withdraw from the contest altogether or continue as a non-contestant. By desertion is meant leaving the car without taking with him the driver and passengers. This rule will disqualify but one of the cars of an entrant in case of multiplicity of entries.

The following provision, the adoption of which in any contest is optional with the promoter, and none of which count against a car or are factors in determining the car's road score, have been added: Rules for tire penalizations; rules for penalization of accessories; the keeping of a record of lubricating oil and of gasoline consumption.

Classes It Manufactured Metal

WASHINGTON, D. C., March 19—The treasury department has been advised that a decision in favor of the government has been rendered by the United States circuit court for the southern district of New York, in the case of United States vs. Thomas Prosser & Son. The merchandise in suit consisted of steel crankshafts, crank axles, piston rods, connecting rods and crossheads, which were invoiced under their respective names, and duty was assessed at 45 per cent ad valorem under paragraph 193 of the tariff act of 1897, as "manufactures of steel not otherwise provided for." The importers contended that they should have been assessed as forgings of steel at 35 per cent ad valorem under paragraph 127. The serious question involved was what is the meaning of the words, "whatever degree or stage of manufacture," used in paragraph 127. In his decision Judge Martin said:

Did congress intend by those words to include the development of forgings into specific articles ready for use, however extensive or expensive the finishing process may be, or do those words simply refer to the different stages of the forging processes? That is, forgings in every stage or degree in the processes of development from the puddling of pig iron to the hammering out into specified forms ready for finishing at the machine shop. Should not paragraph 127 be construed to read "forgings of iron or steel, whatever shape they may be hammered or pressed into, or in whatever degree or stage of development the manufacture thereof may be, not specially provided for in this act, 35 per cent ad valorem?"

The importers' evidence tends to show that anything that was once a forging is always a forging. If this contention prevails, the blade of a jackknife, having been made a forging, remains a forging. Under such a construction of the law, the provision in paragraph 193 that iron or steel partly or wholly manufactured shall be assessed at 45 per cent ad valorem is practically without application, or if it has any application, it is certainly unjust in that a piece of steel that has found its way into a manufactured product and escaped the forging processes must pay a duty of 45 per cent, while if it has once been a forging the duty shall only be 35 per cent. This would be crude legislation, and in my opinion it is an unwarranted construction.

The evidence on the part of the govern-

Reliability contests shall be held under class A—price classification—only and run in the seven divisions of such class, as follows:

Division 1A.....	\$ 800 and under
Division 2A.....	801 to \$1,200
Division 3A.....	1,201 to 1,600
Division 4A.....	1,601 to 2,000
Division 5A.....	2,001 to 3,000
Division 6A.....	3,001 to 4,000
Division 7A.....	4,001 and over

on which the daily running time of the cars is based.

The following average speeds shall be maintained by the cars in the respective divisions:

Divisions 4A, 5A, 6A and 7A.	20 miles per hour
Divisions 2A and 3A.....	18 miles per hour
Division 1A	16 miles per hour

Stock cars only are eligible, and for the purpose of trophy awards shall be divided into two classes according to body equipment: 1, touring car class; 2, runabout class, including runabouts, miniature tonneaus, surreys and double or single rumblers.

ment is that forgings like a steel billet cease to be such when they have advanced to a more finished or perfected article. Under the facts developed by the evidence these articles should be classified as manufactured metal unless we adopt the importers' view—once a forging always a forging—and in that I do not concur. The assessment of duty at 45 per cent ad valorem under paragraph 193 is affirmed.

FORGE PLANT WILL MOVE

Hartford, Conn., March 21—The drop-forging plant of the Billings & Spencer Co., of this city, will be removed to Dividend in the town of Rocky Hill as soon as the transfer can be made. New buildings will be erected just as fast as the work can be done. This action was taken at a special meeting of the board of directors. The cause of the removal of the drop forging department to the down-river town is unique. That is to say the present plant is located in a neighborhood thick with dwelling houses, and it was feared that the residents would not tolerate the operation of the drop shop 24 hours a day, which is necessary under the present busy conditions. The residents of Rocky Hill, in which the town of Dividend is located, are quite anxious to get the shop in that town, and it was voted by the town that if the plant was located there a new highway would be constructed down to the site of the factory, and further agreed that if possible the annual tax on the plant is not to exceed \$500. The new shop of the Billings & Spencer Co. is to be 150 by 70 feet. A dock will be constructed along the Connecticut river and there also are other facilities for shipment of the company's product by rail. This move does not affect any other department of the Billings & Spencer Co. in this city.

CONKLING GOES TO BOSTON

Detroit, Mich., March 22—The executives of the Packard Motor Car Co. last night gave a farewell dinner at the Log Cabin inn to L. W. Conkling, who has resigned as assistant sales manager of the Packard company to become associated with Alvan T. Fuller, the Packard dealer in Boston. There was much informal speech-making which hinged upon the 5 years Mr. Conkling has been with the Packard company and upon the earlier days when he was a champion bicycle rider. Mr. Conkling will take charge of the Fuller organization.

OSTENDE'S RACE PROGRAM

Brussels, March 3—The program for the Ostende meeting has been arranged and includes 20-kilometer speed trials, the flying kilometer, 500 meters and a standing mile. This will occupy 2 days, July 15-16, while on July 17 the reliability run will start, covering a distance of 124 miles over a circuit starting from Ostende and taking in the towns of Sneekrke, Ghrikskes, Zeebrudge, Blankenberghe and Wenduine.

SHOWS HELD IN LOUISVILLE AND SYRACUSE



INTERIOR VIEW OF THIRD ANNUAL SHOW OF LOUISVILLE AUTOMOBILE DEALERS' ASSOCIATION

LOUISVILLE, KY., March 20—The third annual show, under the auspices of the Louisville Automobile Dealers' Association, which was held in the First Regiment armory building, came to a close last Saturday night, surpassing in number of exhibits, attendance, etc., the most sanguine expectations of those having the affair in charge.

The opening of the show on Thursday was proclaimed when Mayor Head pressed a button, which instantly turned the interior of the armory into an electrical glow that surpassed anything of its kind ever seen in the Kentucky metropolis. Thousands of lights blazed through thousands of flags, and three big siren horns screeched a welcome to the large crowd in attendance.

Prior to the opening of the show, Mayor Head and the members of his official staffs were the guests of the Louisville Automobile Dealers' Association at an informal luncheon given at the Seelbach hotel. Mayor Head made the only address, in which he predicted the success of the show. He expressed the belief that before many months had passed that 1,000 registered motor cars would be skimming over Louisville's beautiful streets, and that the capital thus invested would represent at least \$2,000,000.

When the doors opened for the public at 1 o'clock not a foot of space for exhibits was left, and many who desired such space were compelled to advertise their goods by word of mouth alone. The afternoon's attendance footed up 2,500, but when the evening session was on in

earnest it was almost impossible for one to get around in the large hall, the crowd being so dense. The interest displayed on the opening day was so great the committee on arrangements decided to open the doors to the public on Friday at 10 a. m. instead of 1 p. m., as on the day previous. This also increased the attendance, the afternoon crowd of Friday touching the 3,000 mark and 4,000 were interested sight-seers at night.

The sales during the 3 days of the exhibition will aggregate fully 100 cars, representing a total sum of \$200,000. The closing day's attendance showed 4,000 during the afternoon and this figure was passed by the number purchasing tickets at night.

The aftermath demonstrates that the show attracted many individual purchasers from out of the city, in fact from the four corners of the state. The financial success of the show was assured before the doors were opened, as the dealers had put up their pro-rata of expense. Sale of space reimbursed them to a great extent and admission fees were depended on to make up the difference. The association paid \$2,000 for the use of the armory. All railroads entering Louisville gave reduced rates, and the attendance from surrounding points was very heavy.

IOWA'S FOURTH SHOW

Cedar Rapids, Ia., March 19—The Cedar Rapids Automobile Dealers' Association opened its first annual event with glowing colors Monday and continued through the week. Though the fourth show to be held in the state within the past 3 weeks the

showing made was befitting a larger city; creditably arranged as to details and a marked success. Limited quarters allowed the exhibition of only fifty-eight cars of the gasoline, steam and electric types. The dealers and farmers from surrounding towns and country had their buying clothes on and the sales made were numerous. The dealers predict a great volume of business for 1910, owing to the stimulation of the industry in the city. The decorations of blue and white were neatly and tastily arranged. The lighting was well taken care of. The cluster centerpiece of 13,000 candlepower of lights made a beautiful and much-talked-of attraction. Harmony now prevails among the dealers where but a few weeks ago all was chaos. By the use of diplomacy, President Beck smoothed down the ruffled feathers of the local flock; offered the pipe of peace, and all partook thereof. The 1910 show was the result and a meeting has been called for the perfecting of arrangements for a better and larger exhibition for 1911.

MANY AT SYRACUSE SHOW

Syracuse, N. Y., March 19—The second annual show of the Syracuse Automobile Dealers' Association came to a close in the New York state armory here tonight in a blaze of glory. Opening on Tuesday evening with a capacity crowd, the dealers have managed to maintain a nightly attendance that filled the two floors of the large building. It is estimated that more than 20,000 people visited the show, and that more than \$200,000 worth of cars was sold to visitors from the various exhibits.

The decoration scheme was elaborate. More than 10,000 yellow chrysanthemums and red poppies were used in forming a floral canopy underneath the steel structural work of the roof; 600 additional incandescent lamps were installed, and hundreds of ferns and palms were used in the floral effect.

For 50 miles in every direction central New York turned out en masse to the show. The fact that Syracuse is the natural distributing center for central New York state makes this show of unusual importance. There scarcely is a dealer in the city who has not a number of sub-agents scattered throughout the adjoining counties, and with as many of their prospects as they could band together they came to the big show to look over the cars.

There were fifty exhibitors, including accessories, showing in all forty-five different makes of cars. The revolving Thomas chassis was shown. The show took on a decidedly educational aspect in the way of working models, stripped chassis, exposed engines, etc. About ten new agencies were said to have been placed in the surrounding district by the dealers during the show, and prospects for 1910 business are reported as being the brightest in history. Prominent among the new types of cars shown were the torpedo and close-coupled bodies.

PITTSBURG SPACE ALL GONE

Pittsburg, Pa., March 21—All the available space for the fourth annual show was taken up last Tuesday and big premiums are offered for space. Contracts were let during the week for 200 art glass electric light domes which will indicate the names of the exhibitors. These domes are bronze and will be suspended from the ceiling by masses of individual hammered brass chains. There are fully fifty more exhibitors than last year and more than 200 varieties of touring cars and runabouts will be shown. The display of accessories promises to be the largest ever seen in Pennsylvania. March 29 is society night.

Trade Gossip From Detroit; Big Ford Car Shipment

Detroit, Mich., March 22—The Ford Motor Co. shipped 140 cars from its new Highland Park factory last Monday, the largest single-day shipment in the company's history. This was not merely a splurge, as a glance at the company's order book will show. Henry Ford says the company is now in shape to build from 100 to 150 cars per day, the only handicap being a lack of sufficient freight cars to haul them away.

Plans have just been completed in Detroit for a new Ford branch in Omaha, Neb., to be erected in a central location at a cost of \$40,000. Plans are being drawn for another branch building in Cincinnati. Work already is under way on the Atlanta, Ga., branch, and arrangements are being made to erect similar structures in Dallas, Houston, Pittsburg and Cleveland.

A rumor is afloat that the General Motors has a covetous eye on the Ford plant, but officials of the latter say it is without foundation. "All we have to sell are motor cars," they say.

Because of the scarcity of freight cars the Oakland Motor Car Co., of Pontiac, has been driving its machines into Detroit for shipment at the rate of about thirty-five per day. The distance is 25 miles, but the roads are in excellent condition.

Henry G. Cox, formerly sales manager for the Hercules Electric Co., has organized the Michigan Magneto Co., with a capital stock of \$15,000. A plant has been established at 117 Bagley avenue. The company will make magnetos for Detroit car manufacturers.

The Carhartt company, capitalized at \$500,000, is the latest concern to enter the motor car field here. The Carharts are known all over the country as large manufacturers of overalls. Hamilton Carhartt, Sr., is president of the new company. A factory will be established at 1524 Jefferson avenue.

Again the E-M-F Co. is in the limelight. This time it is the trial of Chauncey W. Hammond, former paymaster of E-M-F plant No. 4, who is charged with getting away with nearly \$17,000 of the company's funds last November by cleverly switching a couple of satchels containing limestone for those in which the pay rolls for plants 3 and 4 had been placed for distribution the following day. Because of the importance of the case the jury is being kept in confinement during the progress of the case.

On the strength of an unofficial report that General Motors has earned \$22,000,000 on \$15,500,000 common and \$8,500,000 preferred stock since its incorporation 9 months ago, there has been a sensational advance in General Motors common quotations on the Detroit stock exchange the past week. From 80 bid a week ago, the price soared to 97 Saturday noon, with no offerings, however. It was reported in the street that a private sale had been made at 99.

BIG TRUCK DEMONSTRATION

Boston, Mass., March 21.—Boston had its first look at the coming method of transportation of heavy loads with motor vehicles when W. E. Eldredge, Boston representative of the Couple-Gear Co., gave a demonstration last week of how easily 5 tons could be hauled through the streets. There was a big truck with a trailer, both loaded, and in the presence of the street commissioners and other officials the vehicles moved about, showing how easily the truck could be operated. The street commissioners were asked for a permit to allow the operation of the vehicles, this being necessary because there is a limit to the length of trucks that may use the streets. After considering the matter the street commissioners granted the permit. So successfully has it worked out that the firm plans to keep it in operation the entire 24 hours, using three shifts of men for it.



ANOTHER VIEW OF LOUISVILLE SHOW



SYRACUSE EXHIBITION SHOWING FRANKLIN STAND



DELAUNAY-BELLEVILLE, WINNER OF BIG CLASS IN RECENT SWEDISH RELIABILITY RUN

French Club Bows to the Makers

PARIS, March 6.—After 1 months' hard fighting the Automobile Club of France has had to give way before the combined manufacturers and withdraw entirely from the show business. According to an agreement which has just been arrived at, the next Paris salon will be held by three motor car manufacturers' associations and one cycle makers' syndicate, under the patronage of the club, and with Baron de Zuylen, president of the club, as honorary president of the joint committee. For the first time in 11 years the Automobile Club of France will have no voice in the management of the show, and will not share in the financial benefits.

The authorities now responsible for the motor car exhibition in the Grand Palais are the Syndicate of Automobile Constructors, with M. Peugeot as president; the Automobile Syndicate, an affiliate of the Automobile Club of France, with Marquis de Dion at its head; the Cycle and Automobile Syndicate, presided over by M. Darracq; and the Syndicate of Cycle Manufacturers. The three motor car bodies will each take 30 per cent of the net profits of the show, leaving 10 per cent for the cycle makers. By reason of this agreement, the understanding between the Syndicate of Automobile Constructors and the aeroplane manufacturers for the holding of a joint show, has been withdrawn. The aeronautical men will now hold their own show in the Grand Palais during the last fortnight of October, and the united motor salon will take place in the same hall the first fortnight in December.

The new committee will inaugurate numerous changes in the method of holding the show. Gustave Rives, the genius of the fairy-like exhibitions which came to

an end in 1908, has been asked to withdraw, and his place has been taken by M. Gobron, a manager who will have to work on more economical lines. It is the intention of the manufacturers to hold an important exhibition, for the feeling is strong that an effort must be made to put Paris back into the premier position as a motor center. At the same time there must be no unnecessary expenditure on decoration for decoration's sake. Stands will doubtless be of a uniform type throughout, provided complete, ready for receiving the exhibits, at an inclusive cost. There will be drawing of lots for positions, but not on the previous basis of first reserving the central stands for the oldest established or the most important racing firms. Everybody will now be treated alike. It is very probable, too, that the

show will only remain open 12 days instead of 3 weeks as formerly.

There is a strong feeling that government influence has been brought to bear on the various parties in order to lead to this settlement of the difficulty. The club protested against the aeroplane manufacturers receiving the motor car industry into their exhibition, and the motor firms on the other hand maintained that they were ready to work with the club if reasonable terms were put forth. As the government gives the use of the Grand Palais gratuitously, it was an easy matter to give a hint to the aeronautical group that the hall was not loaned for a joint show, and at the same time advise the club that it had engaged upon a useless struggle in trying to fight the motor car manufacturers. As the club, however, had an option on the Grand Palais, and the manufacturers had not, it was only possible to hold the show by giving that body a nom-

Three Makes of American Motor Cars

STOCKHOLM, March 5—Three American cars, the Ford, Cadillac and Frayer-Miller, took part in the annual winter trials promoted by the Swedish Automobile Club. The Cadillac finished seventh in the big-car division, while the Frayer-Miller dropped out. In the small-car class one of the two Fords was third and the other one did not finish. The results returned a 25-horsepower Delaunay-Belleville winner of the first class, and a 16-horsepower Darracq in the other.

The reliability and endurance trials met with as much success as in former years, and emphasized again the fact that the Swedes—at least the classes which are, and want to become more interested in motoring—are anxiously awaiting the time

when more than one such event will be promoted. To this annual contest, which was held for the first time in 1907, is due in a large measure the development of the motor business in Sweden. All told fifteen cars were entered, of which ten were in the big-car class, and five in the small-car section. The latter consisted of the winning 16-horsepower Darracq, two 20-horsepower Fords, and other European cars. The ten big cars consisted of the winning Delaunay-Belleville, a 50-horsepower Frayer-Miller, a 30-horsepower Cadillac, and others.

The end of the month of February was chosen to hold the trial because it is the time of the year when the roads are generally at their worst. The winter tour, as



TYPICAL ROAD SCENE IN WINTER TESTS OF SWEDISH AUTOMOBILE CLUB

inal share in it. This was done by asking the club to patronize the show and put its president, Baron de Zuylen, in the position of honorary president of the joint organizing committee.

There is again some talk of the possibility of a new French club being organized this summer. Ever since the grand prix has been buried there have been more discontented members than ever. The present situation with regard to the Paris show only has added to the opposition, and although for patriotic reasons some of these dissatisfied ones are not willing to speak, or if they do, are saying what they actually do not think or mean, it is known by those who mingle with the club members that practically all the tradesmen are dissatisfied with the present club. With the exception of a small number of actual business men, people really in the automobile or parts business, all the others are sportsmen, and wealthy individuals.

Export Showing of the Belgians

BRUSSELS, March 3—Belgium's motor car export business in 1909, although showing a gain over that of 1908, was not as brilliant as had been anticipated. Yet the Belgian car makers cannot complain because proportionately as compared with the business done by makers across the border line, those of France, Germany and Great Britain, little Belgium occupies about the last position.

The grand total of the business, including cars, parts for motor cars, motor cycles and motor cycles parts show that \$2,611,073 worth of these goods exported from this country last year, an increase of \$44,391 over the record for 1908. There were exported 591 complete cars or chassis, or 137 more than in 1908. The value of the 591 cars was \$1,343,191, or an average of \$2,272 per car, while in 1908 the value of

the 454 cars exported was \$1,207,327, or an average of \$2,659 per car. The exportation of motor car parts dropped from \$1,061,609 in 1908 to \$1,040,270 last year. Only 1,587 motor cycles were exported, valued at \$206,262, instead of 2,063, valued at \$265,531 in 1908. Motor cycle parts exported were worth \$21,350 instead of \$32,215, as in 1908.

The past year shows a large increase in the importation of foreign motor cars into Belgium. All told 357 cars were brought into the country or 153 more than the year before. These 357 cars were valued at \$445,868, or an average of \$1,249 per car, while the value of the 204 cars imported in 1908 was \$208,637, or an average of \$1,375 per car. Motor car parts to the value of \$451,673 were imported, instead of \$411,939, as in 1908. The 105 motor cycles imported are valued at \$9,094, while the seventy-seven imported in 1908 were valued at \$6,834. The motor cycle parts importations had a value of \$1,864 last year, or \$27 more than in 1908. All told, in 1909 the imports show an increase of \$207,252 over those of 1908, which is one of the biggest increases recorded in years. Comparing the total export business with the importations it is seen that the Belgians exported by \$1,702,574 more than they bought from foreign countries.

It may interest American manufacturers to know where the Belgian cars, parts and motor cycles go. As in 1908 Great Britain was Belgium's best car customer, having purchased 154, or one more than the previous year. Germany is second, having imported 123 cars last year, or eight more than in 1908. Australia, which did not buy any Belgian cars in 1908, imported fifty-six last year.

Compete in Swedish Winter Reliability

the event is called here, was held over a route a little over 320 miles in length, leading from Stockholm to Gothenburg. The cars could be driven day and night as the contestants wished, but it was stipulated that during the daytime the average speed could not be greater than 15.5 miles an hour, and during the night not more than 12.5 miles an hour. There were five controls along the course and thirty-four sub-controls where the cars did not stop, but where their numbers were taken, and the time of their passage recorded.

Instead of having bitter cold weather, as in former years, it happened that several days previous to the start and all during the trials it was so mild that the

snow and ice were melting all along the course, except in the mountains. Many a car was stalled, sometimes for hours, in the mountain region, and even upon the level roads. At places it was so slippery, from the slush, that anti-skidding devices had no effect upon the wheels. Thus it was that several cars slipped off the road. Even the big Delaunay went thrice into one of such excavations. The first time the driver got the car out without trouble, but the second and third time it required hard work and assistance from the passengers. No mechanical trouble resulted. The Frayer-Miller, which had been going well during more than half of the course, met its Waterloo when it slipped into one of these ditches.



The Readers' Clearing House

SPARK POSITION ON HILLS

DU BOIS, PA.—Editor Motor Age—Through the Readers' Clearing House will Motor Age kindly answer the following questions:

1—Does it pay to have tires retreaded.

2—In climbing a hill what position should the spark be in reference to the throttle, or, in other words, should the spark be in advance of the throttle or the throttle in advance of the spark?—X. Y. Z.

1—It certainly does pay to have tires retreaded if they are not too far gone, that is, if the fabric has not been exposed to moisture, water-soaked so to speak, and decayed. The time to retread a tire is just before the fabric becomes exposed, or immediately after. Retreading becomes very expensive when several layers of new fabric have to be put on to replace those which have been taken off on account of wear or damage from moisture, and in such cases it does not pay.

2—It all depends upon the adjustment of the spark and throttle levers, and upon the characteristics of the motor or car. It is on account of the great variation in conditions to which the motor is subject, that the spark and throttle levers are provided; the driver must use his own judgment as to their proper manipulation, and his ability to judge develops with practice. In climbing hills, the position of the spark lever relative to that of the throttle depends upon the speed of the motor; if the motor runs lightly and is not laboring, which it should do if an effort is not be-

ing made to ascend on too high a gear, the spark should be advanced as far as possible without producing a knock or retarding the speed. The throttle should be advanced till the driver feels that the motor is doing its best. A good policy is to start the hill with a full throttle and spark advanced, then retard the spark as the motor commences to labor. If the motor continues to labor descend to a lower gear. If the hill is very steep and the ascension must necessarily be slow it is advisable to start on a low or intermediate gear.

TWO FRONT CYLINDERS MISS

Chippewa Falls, Wis.—Editor Motor Age—We recently received in a trade a Buick model 10. The motor was not acting at all well and we overhauled it completely, cleaning the cylinders, grinding the valves, cleaning the carbureter, timing the valves by marks on the flywheel, and setting all distributing and contact points in the Remy magneto according to their instructions. After the car was completely assembled we tried it out on the road. The motor ran beautifully at high rates of speed, but lurched and ran on two rear cylinders only when throttled down. This seemed to indicate magneto or carbureter trouble. First we tried all adjustments of the carbureter, which is a model D Schebler, with no better results. Then, following the Remy instructions, which say, "If motor misses with spark retarded at slow speed adjust the contact screw, by loosening about one-quarter turn." We adjusted the magneto with no better results.

The timing is right, the valves all seat, there is no obstruction or leak in the manifold, the magneto gives equal spark to all four cylinders, but still when the engine is throttled down cylinders 1 and 2 do not fire steadily. We changed the plugs, putting plugs from 3 and 4 into 1 and 2 but cylinders 1 and 2 still refuse at low speeds while running fine when the engine is on full throttle. There is not too much oil in the crankcase. Will Motor Age tell me what is the trouble?—C. P. Barker.

Although you state that valves all seat and there are no obstructions in the intake manifold, the symptoms you give are characteristic of a poor mixture—a mixture containing an abnormal proportion of air. While the motor is running hold your hand or a cloth saturated with gasoline over the auxiliary air intake of the carbureter; do not close the opening entirely but with care so that the supply of air admitted is gradually regulated. This should be done while the motor is running slowly and missing, so that any change for the better can be readily noticed. If this test brings no results, test the strength of the valve springs by taking hold of the springs of both the exhaust valves of the missing cylinders while the motor is running, and increase their tension by pulling them up against the end of the valve stems. If the missing stops, stronger springs should be fitted to these valves. If neither of these tests is successful, and you are positive no air is being admitted through the joints or possible sand holes

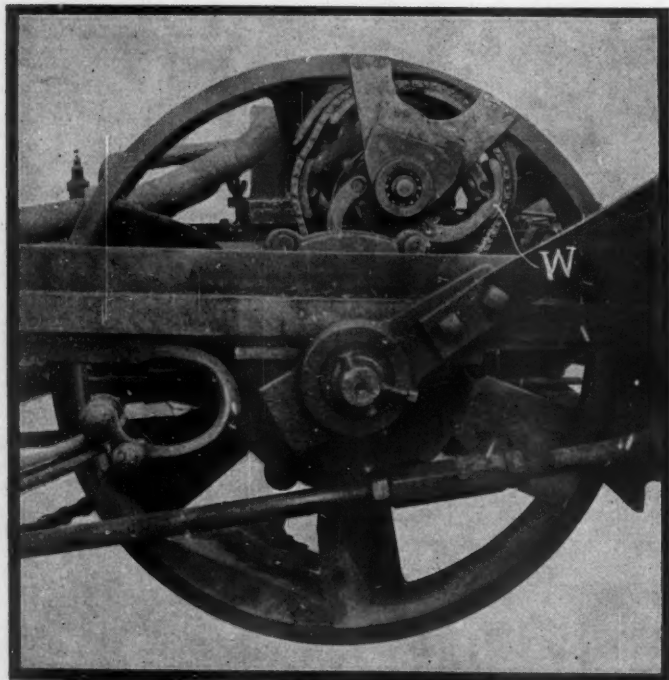


FIG. 1—SHOWING MECHANISM SET FOR REVERSE SPEED

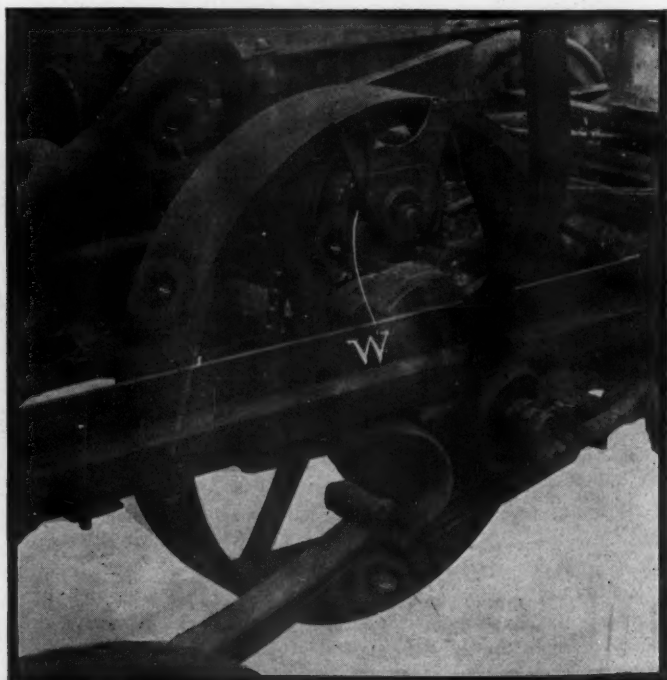


FIG. 2—SHOWING MECHANISM SET FOR DIRECT DRIVE

in the inlet piping, put oil or soap-suds around the spark plugs, valve-cages, etc., then turn the motor over slowly by hand and see that there is no escape of gas around these joints. If this brings forth no results, it would be advisable to use a compression gauge and see if the compression is uniform in all the cylinders and also to see if the missing cylinders hold their compression as well as the other two. If the compression is not satisfactory in the missing cylinders the trouble may be due to ill-fitting rings or pistons, or both. Before tearing down the engine again, however, it might be well to give the missing cylinder a good dose of kerosene, followed by a couple of tablespoonfuls of cylinder oil in each cylinder.

THE BEST GARAGE

Sioux City, Ia.—Editor Motor Age—I desire to construct an inexpensive garage for an electric and gasoline car on my home lot. As I am somewhat limited for space I desire to know which is preferable, concrete or wood floor, and also would like to know the height, size of doors, and such other information as would be of assistance to me in planning such a building.—A. J. More.

You are referred to a special story on garage construction will appear soon in Motor Age. From this story it is apparent that wood is not a desirable material for garage construction. Motor Age would like opinions from readers who have had experience with wood, stone, brick or concrete garages.

THE MOTOR OIL FREEZES

Lafayette, Ind.—Editor Motor Age—I have been using Polarine and No-Carbon oils in my gear-driven lubricator on an air-cooled motor. During this excessive cold weather these oils absolutely solidify and positively will not feed. I would like

to know if there is any objection to adding an amount of regular coal oil—used in lamps—to keep these oils fluid. Any suggestions Motor Age can offer will be appreciated as I have on hand the lightest oils furnished and they solidify.—A Subscriber.

You undoubtedly are using the wrong grade of oil. It is not necessarily the lightest grade of oil that will retain its fluidity at the lowest temperature. When in trouble of this kind it is advisable to consult the manufacturer of the oils you are using. If the manufacturer is a reputable one he will furnish you with the proper kind of oil and guarantee it, or recommend you to a firm which handles the proper grade. There are oils on the market which are guaranteed not to freeze in any temperature in which a motor car is practically used. It is not good practice to mix kerosene with cylinder-oil for the purpose mentioned as it simply cuts the body of the lubricant and greatly reduces its efficiency.

HAS A NOVEL GEARSET

Chicago—Editor Motor Age—Inclosed herewith are a few pictures of a new transmission, in which no doubt Motor Age will be interested, the object of my letter being to find out the opinion of Motor Age in this respect. I have one mounted on a car at my home and found it very efficient, and will try to describe some of the details. This device goes from full speed forward to a stop, and reverse. By moving the lever forward and backward any speed desired can be had. It can be made for shaft drive as well as chain. Picture No. 1 shows a side view with the planetary wheel contracted and stationary wheel expanded; when in this position the car is in reverse. Picture No. 2 shows same view with planetary

wheel expanded and stationary wheel contracted, causing the car to be in direct drive. You will note that when planetary wheel is expanded to its full diameter, stationary wheel is contracted, allowing the metal belt to become loose. When in this position the planetary wheel does not revolve on its own axle, but becomes a part of flywheel, and direct drive is obtained. Picture No. 3 shows a view on opposite side of one and two, showing the sprocket S keyed to the planetary wheel shaft with the chain C transmitting power to a sleeve L on main shaft, which in turn transmits power to the rear wheels by the aid of a sprocket on the other end of the sleeve. Picture No. 4 shows a simple mounting for chain drive, which I am using at present.—Ed. M. Steinle.

TYPES OF REAR AXLES

Brimfield, Ill.—Editor Motor Age—Through the Readers' Clearing House will Motor Age explain the live rear axle, semi-floating rear axle, and the full-floating rear axle?—C. L. C.

A live rear axle is the name applied to the kind of axle used on shaft-drive cars. It is called live because within the axle are carried the differential, gears and drive-shafts, which are rotating. The word live is in opposition to stationary, a stationary axle being one in a chain-drive car and in which the axle is practically the same, except for the steering knuckles, as the front axle of a car. A floating rear axle is a live axle in which the two drive-shafts in the axle can be withdrawn without taking off either of the rear wheels or jacking up the car. All that it is necessary to do is remove the hub caps and withdraw the shafts. A semi-floating rear axle is one in which the axle driveshafts cannot be removed without taking off the road wheels. This type of axle is common



FIG. 3—VIEW OF OPPOSITE SIDE OF NOVEL GEARSET

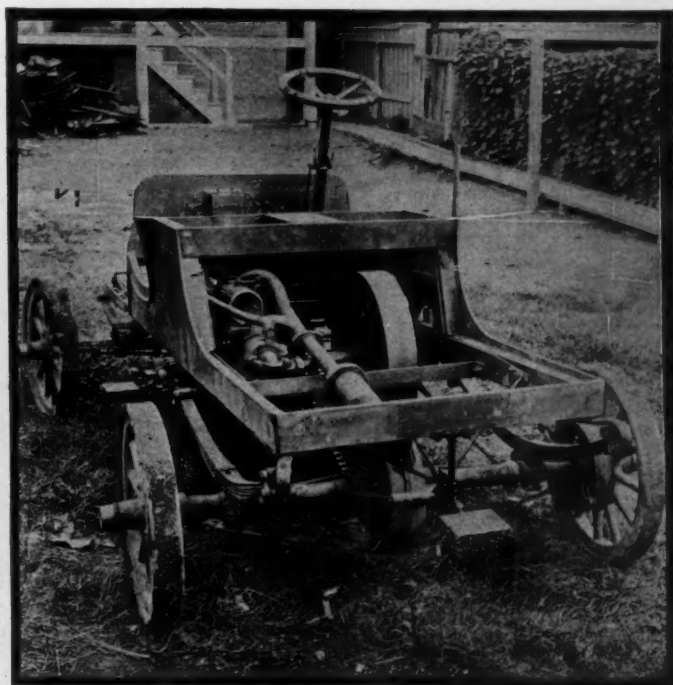


FIG. 4—STEINLE'S TRANSMISSION AS ARRANGED IN A CAR

where cup-and-cone ball bearings are used, and where the wheel is fastened to the end of the driveshaft by taper and key. In a floating axle the bearings on which the road wheels are carried are outside of the axle housing, whereas in a semi-floating axle these bearings are generally inside of the axle housing.

ONE CYLINDER FAILS TO FIRE

McNabb, Ill.—Editor Motor Age—Will Motor Age, through the Readers' Clearing House columns, kindly tell me why one cylinder in my two-cylinder Reo does not fire? I know it is not in the spark, for there is nothing wrong with the plugs or coils. It must be in the carbureter; I have tried to fix it but failed, and know of nothing else.—Clarence E. Clemens.

If you have tried adjusting the carbureter it is quite possible that you have damaged the seat of the needle valve, in which case adjustment is impossible. Your trouble, however, may be due to poor compression in the missing cylinder. Test the compression by turning the motor over slowly; then, if necessary, grind the valves. If the compression still is poor after the valves are properly ground in, see that there is space enough between the end of the valve-stem and the push-rod when the valve is closed; this space should be great enough to allow three or four thicknesses of newspaper to readily pass between the ends. You might also test the valve springs by pulling them against the ends of the stems while the engine is running. Increasing their tension in this manner will close the valve tightly and cause the motor to explode regularly if the trouble happens to be due to weak springs. Also look for air leaks around the intake pipe connections, cylinder plugs and valve guides. The valve stems should not be too loose in their guides. For advice on the adjustment of a Reo carbureter read the answer to the following inquiry.

TROUBLE WITH NEW CARBURETER

Mendota, Ill.—Editor Motor Age—Will Motor Age, through the Readers' Clearing House tell what is wrong with my car? Last May I purchased a new Reo touring car, and have run it about 500 miles. It has done good service, but I have always been bothered with it heating so the water would soon boil, making the car uncomfortable to ride in. This winter it has been impossible for me to crank it, but as it is thawing today I went to the garage and tried to turn the engine over, getting no results whatever.

What is the best material to stop a leak around the intake and exhaust valves, covers and gasoline connections?

Are equal parts of kerosene and alcohol a good liquid to dissolve and clean the carbon from the valves? If not, what is the best preparation?

Which is the more economical as well as proficient, dry cells or storage battery?

Are those mixtures, as advertised, for cold vulcanizing of small cuts in tire

treads a success, and will they not injure the tire?—J. E. Derham.

The overheating of your car undoubtedly is due to mal-adjustment of the carbureter. To adjust a 1909 Reo carbureter first close the air valve at the side and the needle valve on the top completely, then open the air valve on the side about half a turn and the needle valve about three-quarters of a turn, then with the spark retarded and the throttle open about one-quarter start the motor and regulate the needle valve until the motor explosions occur regularly. Then with the spark advanced about half way and the throttle open fairly wide regulate the screw in the intake pipe opposite the carbureter. If the engine still continues to run warm try opening the air valve on the side of the carbureter little by little.

You are unable to start your motor because the oil used in the transmission has most probably become so hard from the cold that the transmission is not free. If you will jack up one wheel of the car you will have no trouble in getting the motor started, and as soon as the transmission warms up a little it will become free. If you would use a lighter grade of oil your trouble from this source undoubtedly would be eliminated.

For stopping leaks around the cylinder plugs over the valves those having ground joints generally require nothing more than tightening up. If this does not stop the leak, however, powdered graphite sprinkled on the seat or mixed with glycerine to form a paste and then applied generally will bring out the desired results. For intake pipe connections a lead gasket or a paper one well smeared with shellac will aid in securing a tight joint if there is room enough to use a gasket, and where there is not sufficient room for a gasket a simple application of shellac is advisable.

Kerosene alone has been used as a carbon remover, and Motor Age knows of no benefit to be derived from the addition of alcohol. There is a number of carbon removers on the market which give good service. After using kerosene or any preparation for removing carbon, always inject a couple of tablespoonfuls of oil in each cylinder before starting the motor, as a preparation which will remove carbon generally cuts the lubricant as well. If you are in a locality where a storage battery

can be conveniently charged and given the proper attention it is generally considered the most economical and proficient.

There are mixtures on the market by means of which tires are repaired by a process of so-called cold vulcanizing which is meeting with the entire satisfaction of their users.

CAN USE GRAPHITE FOR BEARINGS

Chancellor, S. Dak.—Editor Motor Age—Will Motor Age, through the Readers' Clearing House, tell me whether graphite cup grease is good for the grease cups on the bearings of a Cadillac motor, namely, the pump bearings, idler bearing, etc.? Is vaseline a good lubricant for ball bearings in front wheels, and for packing the timer?—E. C. Hofmeister.

Graphite cup grease will be all right for pump bearings and idler bearings. Any lubricant can be used for ball bearings in the front wheels of a car if it does not contain acid, and if the grade of vaseline is free from acid, as it generally is, it will serve all right for this work.

HOW TO CONNECT DRY CELLS

Richmond, Hill, L. I.—Editor Motor Age—Will Motor Age through the Readers' Clearing House kindly give me the following information? I have a two-cylinder runabout, and for ignition use two sets of five dry cells each, connected up as per Fig. 1. I use one set at a time and when both grow weak I use them together. In this way I get about 400 miles from the two sets. Should I get more mileage from having them connected up in this way, and can Motor Age suggest a way that will be more economical?—P. H.

With but four cells in series to a set, and proper adjustment of the coil, the spark you would get would perhaps be just as efficient as that which you get from the use of five cells in series. A spark coil properly adjusted should not draw more than .3 to .5 amperes with the engine running and indicated by dead-beat low-reading ammeter. A single spark of sufficient heat to ignite the mixture is all that is required, and all energy drawn for additional sparks is waste. The number of cells, however, to be used in series depends mainly on local conditions, and an arbitrary rule cannot be laid down to govern this. You also might get longer and more efficient service from your two sets if you would connect them in series-multiple and use them both at the same time. Series-multiple connection is shown in Fig. 2, and is the same as your illustration except that the positives are connected to the same pole of the switch, or to each other, and them to the switch. By connecting a number of series sets in multiple the voltage is not increased and therefore the strain on the coil is no greater than when using a single set. For example: If four cells are connected in series you get 6 volts. If three or more sets were connected in multiple with this, the resulting

FIG. 1—TWO SETS OF CELLS IN SERIES

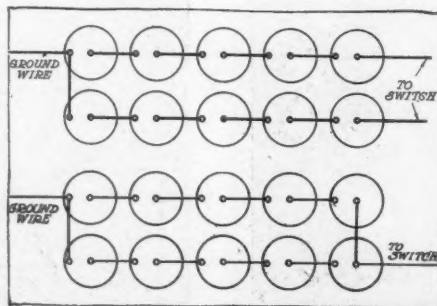


FIG. 2—TWO SETS IN SERIES MULTIPLE

voltage on the whole battery still would be six. The ampere capacity, however, would be four times as great as that of a single set. The increase in efficiency by series-multiple arrangement is due to the fact that the amount of current used by the coil is drawn equally from the four sets, so the current drain on each set is only one-fourth of the total. This means that the battery is being used under much more favorable conditions and the total amount of energy given out would be largely increased. The cells also could be used to a much lower amperage than when used in single series sets.

MOTOR CYCLE INFORMATION

Prairie Home, Mo.—Editor Motor Age—Will Motor Age answer the following questions through Readers' Clearing House:

1—What size motorcycle is considered best for a person who is not desirous of excessive speed yet wishes plenty of power for hills and rough roads? I have had some experience with motor cars but know but little about motor cycles. Would one, two or four-cylinders be the most suitable?

2—What provision is made on motor cycles for the retiming of valves?

3—How many miles of service should a good motorcycle ordinarily give?

4—What is the usual mileage for a set of tires?

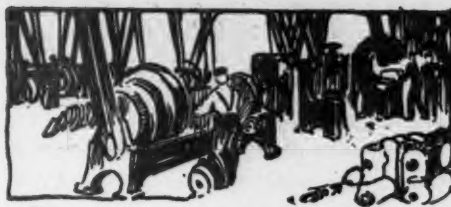
I believe I should prefer multiple cylinders, magneto ignition, all valves mechanically operated, shaft drive, and a medium-weight machine. Am I right?

5—Please give me the address of a good motor cycle magazine or two.—Motor Cyclist.

1—A motor cycle of about 3 or 4 horsepower is considered best for the purposes above mentioned and both the single and multi-cylinder machines have their respective advantages. A slow-moving single-cylinder machine has larger dimensions and its advantages are simplicity and greater wearing ability. The single-cylinder is a very popular machine and the multi-cylinder is steadily increasing in popularity. The shaft drive is being successfully used with four-cylinder motors, but as yet has not been demonstrated as practicable on one or two-cylinder motors.

2—The same provisions are made for retiming of valves on motor cycles as on motor cars. The gears generally are contained in an accessible case, and to change the timing it is only required to shift them a tooth or so one way or the other.

3—The service of a motor cycle as with a motor car depends to a great extent upon the care given it. If driven considerably a good motor cycle should with a regular overhauling once a year give good service at the rate of 7,000 miles per year for at least 5 years. One motor cycle man claims he knows of a machine which has been in use for 10 years, and never has been overhauled; another states that 100,



000 miles is a rational approximation for the life of a machine. Motor Age knows of one or two machines which have been in constant use for several years and are still on the job.

4—The usual mileage for a set of motor cycle tires is from 3,000 to 5,000 miles, and it is claimed by many that even more is obtained by changing the tires around—exchanging the one from the front wheel, which wears less quickly, on to the rear wheel when one on the rear begins to show signs of wear. Your ideal machine is a very good one.

5—Motorcycling, of Chicago, and Motor Cycle Illustrated and Bicycling World of New York.

DISHCLOTH CARBON REMOVER

Aurora, Neb.—Editor Motor Age—A model 10 Buick has been giving me much trouble with a knock in one cylinder, which finally was determined to be caused by carbon. Having seen in Motor Age mention of the method of removing it by means of the wire dishcloth I made very successful use of it in the following manner: The spark plug, both rocker arms, and the exhaust valve and cage were removed from one cylinder; the wire cloth then was placed in the cylinder through the valve opening and the valve and cage replaced and lightly held by engaging the retaining nut; the engine then was run on the three remaining cylinders for about 30 seconds; the valve and cage were again removed and the carbon was found ground to a fine powder and mixed with the lubricating oil to the consistency of a thin paste; the cylinder was thoroughly washed out with kerosene by means of an oil gun; all of the removed parts were replaced ready for running and the second cylinder prepared in like manner and the engine again run for 30 seconds, which cleaned out the second cylinder of carbon and the first cylinder of kerosene at the same time. This process when completed for all of the four cylinders required less than an hour, cost practically nothing but the

time, and undoubtedly removed all of the carbon, and dispensed with the knock entirely. I am well satisfied with the experiment and write to let others know of my success along this line.

It is essential to remove the rocker arms to allow the valves to remain closed so that the wire cloth will not get between the valve and seat. Removal of the spark plug allows the air to carry out much of the carbon with it as it is loosened. Washing with kerosene prevents injury to the cylinder by the powdered carbon. This method is applicable to valve in the head engines where there is sufficient clearance above the piston at its highest point, and where the valve mechanism will permit of removal so the valves may remain closed. It could not be used on engines employing auxiliary valves with ports which would allow the wire cloth to enter and probably do serious harm. After running the engine cleaned as above for about 20 miles the compression was poor, probably caused by some of the powdered carbon lodging between the valve and seat, but a few more miles running removed this trouble entirely and it is now running as well as it ever did and I have no cause for further complaint.—I. W. Haughey.

WHO HOLDS GEARSET PATENTS

Richmond, Ind.—Editor Motor Age—Answer the following: 1—What is patented about the selective gearset, and is the patent now in force? If so, who owns the patent? 2—Are there any live patents on the progressive gearset?—A. Henry.

1—The patents on selective gearsets are controlled by the Mercedes company, of Germany.

2—Motor Age does not know of any live patents on the progressive gearset.

STROKE IN HORSEPOWER

Buffalo, N. Y.—Editor Motor Age—The following is a horsepower formula which takes the stroke into consideration; the French formula:

Horsepower =

$$0.1185 \times N \times B^2 \times S^2$$

$$0.1185 = \text{Co-efficient}$$

B = Bore

N = Number of cylinders

S = Stroke

The following horsepower table is for usual sizes of four-cylinder motors.—G. Chedru.

TABLE SHOWING HORSEPOWER ACCORDING TO FRENCH FORMULA

BORE	3	3 1/4	3 1/2	3 3/4	4	4 1/4	4 1/2	4 3/4	5	5 1/4	5 1/2	5 3/4	6	
3 1/4	13.5	16.3	19.4	23	27.2	31	35.5	40.5	46					
3 1/2	14	17	20.2	24	28.3	32.5	37	42.3	48					
3 3/4	14.6	17.7	21	25	29.5	33.8	38.6	44	50	56	62.8	70		
4	15.2	18.4	22	26	30.7	35.2	40.2	45.8	52	57.2	65.2	72.8	80.4	
4 1/4	15.8	19	22.8	27	31.8	36.5	41.6	47.5	54	60.5	67.7	75.2	83.5	
4 1/2	16.3	19.7	23.6	28	33	37.6	43	49.3	56	62.5	70	78	86	
4 3/4	16.8	20.4	24.4	28.8	34	38.8	44.5	50.9	58	64.3	72	80.5	89	
5	17.4	21.1	25.2	29.6	35	40	46	52.5	59.6	66.6	74.2	83	92	
5 1/4		21.8	26	30.5	36	41.2	47.4	54	61.3	68.5	76.6	85.8	95	
5 1/2		22.5	26.8	31.4	37.2	42.5	48.8	55.7	63	70.6	78	88.2	97.8	
5 3/4			27.6	32.3	38.3	43.6	50	57	64.5	72.2	80.6	91	100	
6				28.4	33.2	39.2	44.7	51.2	58.4	66	74	83	92.8	102.3

PERTINENT POINTS ABOUT PATENT LAWS

IT seems to me there could be no more opportune time to discuss the question of patents and their adjudication than the present, when there is so much in the air with reference to the Selden patent. Motor car manufacturers, dealers and users in general are not and cannot be expected to be well versed in regard to patents or the processes of the patent courts.

To the ordinary layman a patent is a patent, and in general is a bugaboo. It has been my fortune, and perhaps sometimes my misfortune, to have had to do with patents for 30 years as an applicant and procurer of patents and as a litigant, both as complainant and defendant. I take it, therefore, that the readers of Motor Age will not take offense if I make a plain and simple statement, not at all technical, in fact devoid of all technicality, in regard to matters that may be of vital importance to some of them. After having made a simple exposition of the case the readers of Motor Age can draw their own conclusions. It is not in my province to draw their conclusions for them or to pass any judgments.

Evolution of the Patent

I am not a lawyer, or son of a lawyer. If I were a lawyer, possibly what I have to say might not have as much weight because some reader might think I had an axe to grind. It probably will take several articles to put the matter completely and plainly before the public, and it seems appropriate that the first should deal with the question of a patent itself. For more than a century the leading nations of the world have acknowledged the right of property in ideas. Of course, a nation has to be far advanced in civilization before it can appreciate that when a man has thought out a construction producing results never produced before or producing these results in a simpler manner or producing these results more cheaply, he is entitled to consideration in a monetary way for his thoughts, the same as though he had devoted his time to the making of something, as a hat or a pair of shoes, which all would acknowledge as his when he had them done. With the ordinary unschooled mind there is too much idealism in patents to have their value and the property rights in them appreciated; consequently there arises a prejudice against patents.

Before governments undertook to protect the rights of property in ideas, the inventor could only hide his invention and produce his manufactures under lock and key. If he had a new process he carefully kept it in his mind, without putting it on

EDITORS' NOTE—This is part I of a series of three articles on the patent situation by Warren S. Johnson, president of the Johnson Service Co., Milwaukee, Wis.

paper. The result was that when he died his process died with him. With modern advancement there were a great many machines that were used in public, and a man having invented a machine could not hide it under a bushel. The result was that as anyone could copy his machine, he failed to try to improve it or put it on the market. This, of course, was a detriment to progress. The leading nations therefore said to the inventor:—"If you will put in picture form and give a description of your invention so that anyone else can build your machine or carry out your process by a careful reading of the documents, providing such reader is skilled in the art, to the end that when you are gone the world still will have the advantage of your ideas, we will protect you for a certain time in the exclusive use of your ideas, or grant to you the privilege of selling to others the right to use your ideas, after which your ideas become the property of the public. You must state plainly in these documents just exactly what you claim as novel. In other words, you must make your invention patent or plain." From this fact comes the term "a patent."

In the United States the term of protection is 17 years, and a patent cannot be renewed. Some people have an idea it can. In order to have a patent extended in any way it has to be done by a special act of the congress. During the life of a patent the owner can do exactly as he pleases with it. He can put it in his pocket and do nothing with it,—he can use it for himself or he can license others to use the patent, if he so desires. He can license one party and not another if he sees fit. He is not obliged to license one party because he licensed another, nor is he obliged to charge the same royalty to different parties. It is his own property, and he can do with it just as he pleases, the same as he could with a watch which he has bought: He can sell the watch, use the watch, or put it away as an heirloom of his progeny if he chooses. There is much misinformation on this one subject. People think that the man receiving a patent must put it into use or must license others if they apply for it, or must give a license to one if he does to another. That is entirely erroneous.

The patent itself is divided into two parts called claims and specifications. The

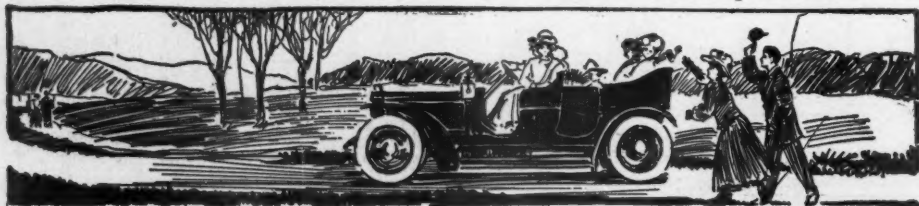
claims usually follow the specifications. The specifications when necessary are accompanied by drawings to further elucidate the invention and to make it possible for one skilled in the art to build a machine from the specifications. If these specifications are not so drawn that an ordinary person, skilled in the art, can build a machine from them, the patent is invalid. If it is shown that the device is inoperative, that is, if it cannot perform the function that it is intended to perform, the patent is invalid. If it is shown that the device is not new,—that the matter has been disclosed by others in patents or other publications or it can be shown that the same device has been used publicly more than 2 years before by some other individual or that the patentee has allowed it to be used in public more than 2 years, the patent is void.

After the specifications there come the claims, in which the patentee must state positively and exactly of the whole device, what part he claims. At the present day nearly all patent claims are combination claims. That is, a claim is not for a single device which is new in itself. A claim may be valid if each of the elements in the combination are old in themselves, and operating by themselves, providing that in combination they produce a new result or produce an old result in a simpler way or an improved result. It is not my province to discuss just exactly what constitutes an invention or an infringement of a patent. Merely putting in a combination an old element that is the equivalent of another old element is not considered an invention. If the claim consists of a combination of old elements and the combination also is old excepting that there is a substitution of another old element for one of those previously used it is not considered that there is any invention.

Laws of Equivalents

The substitution of one element for another of this kind comes under the law of equivalents. For instance, a spring and a weight have exactly the same function in a machine, ordinarily. Consequently if there is a claim for a weight in combination with other things, substituting a spring for the weight will still infringe the patent. On the other hand if the combination were old with the weight it is not a patentable device if a spring is substituted for the weight.

A patent is prima facie evidence only of an invention. The government guarantees nothing in granting a patent. It receives the application of the applicant. It undertakes through its examiners to look into the state of the art. If this examination appears to show that there is an invention, a patent is granted, but the examination is made often by examiners who have not time to make a thorough investigation of the subject. The inventors and would-be



inventors of the United States have paid into the patent office millions of dollars more than it has cost the government to carry on the office, but this fund is in the hands of congress and the patent office cannot use it, although it belongs to them, without an act of congress, and congress is very loath to make appropriations where its members cannot see some personal or political advantage in such appropriations. The result is that the patent office has not time to thoroughly examine an application to find out, really, whether a patent is properly issued or not, so, as a whole, patents come out, as one might say, half-baked, and there practically is no evidence at all that a patent is valid because it is issued.

Only Prima Facie Evidence

Anyone who has had experience sets no value whatever on an unadjudicated patent unless his knowledge of the state of the art is such that he can himself determine whether the patent is valid or not. I have had claims which were drawn by attorneys and allowed by the office that I was obliged to cut out, because they would be invalid and should be cancelled, since my own knowledge of the state of the art was sufficient to warrant the assertion. This only indicates that the examiners in the patent office are not so well versed in all the arts as they should be, but probably as well as they can be under the circumstances. I therefore reiterate that a patent is only prima facie evidence of invention, and it requires action of the courts to determine whether the patent is valid, and necessitates on the part of the owner of the patent an appeal to the court to determine its validity.

Through the ignorance of the people many of the owners of patents bluff them through. Having a patent, they threaten the manufacturers, dealers and users, and oftentimes these people, not wishing to go into court and to the expense, cease using a device without any just grounds for so doing except the threats which they have received.

It is not generally understood that each claim in a patent stands by itself, and each one is actionable by law as of itself. For instance, a patent may have ten claims, but these ten claims do not all stand and fall together. One of them may be valid and nine may be invalid. The patent stands as to the one valid claim. A suit if brought must be brought on the claim that is held by the court to be valid. On the other hand, nine of the claims may be valid and one may be invalid. If a suit is brought on the invalid claim the complainant will lose, notwithstanding he has nine valid claims.

With the permission of the readers of Motor Age, in the next article I will speak on the question of legal processes for determining the validity of patents, the infringement of patents, etc.—Warren S. Johnson.

Milwaukee, March 8, 1910.

Manufacturers' Communications

TIRE TERMS DEFINED

AKRON, O.—Editor Motor Age—Even among motorists some of the terms used with reference to tires are not understood. It is really surprising how many different names and terms owners use in referring to different tire parts and conditions. Some of them have become generally adopted words and phrases. New things in up-to-the-minute dictionaries will be about as follows:

Bead—That part of a tire with the thread removed.

Flap—A fabric lip or band running around the inner circumference of a quick detachable casing, serving the dual purpose of protecting the tube from pinching under the beads and rust of the rim.

Fabric Separation—The separating of two or more plies of fabric, usually due to moisture, sand or dirt entering the tire through a cut, or by reason of tires being insufficiently inflated. As the plies rub upon one another they may give way, causing a blowout. The fabric of tires rightly made of first-class materials, will not separate except for the causes mentioned. Prompt repairs of cuts, and other preventive measures, are the remedies.

Pinch—Used with reference to tubes. An injury caused by tube being squeezed between the rim and casing, staybolt and casing or other surfaces. Can be patched; though vulcanized repairs are better.

Sand Blisters—Lumps on tires caused by sand or foreign substances working into the thread and between the rubber and fabric, through cuts or punctures. Prompt repairs highly desirable.

Stone Bruise—An internal injury to the tire casing, usually caused by violent collision with some blunt projection. Hard to detect until revealed by the blowing out of the tube. If it is believed to exist it usually can be found by very close inspection, the rubber and fabric of the deflated tire bending more easily at this point. A repair in time will save inevitable mishap on the road and also save the inner tube.—Diamond Rubber Co.

FAVORS POWDERED GRAPHITE

Saginaw, Mich.—Editor Motor Age—We notice in the issue of Motor Age of the 3rd inst. that in an article entitled "Putting Car Into Commission," the free use of graphite is strongly recommended, which is, of course, very good advice. We observe, however, that care has been taken

to in every instance specify flake graphite, which, permit us to say, is 'not in accordance with the latest best practice in that finely powdered graphite has been, for the reasons below stated, found to be more generally satisfactory as a lubricant.

To make a distinction between these two kinds of graphites—powdered and flake—we are herewith enclosing samples of both, with the suggestion that the editor take a small quantity of the flake product and rub in the palm of the hand, on paper, or other convenient surface when it will be seen that but a small proportion adheres under friction. It will also be seen that 90 per cent of same is easily dislodged by simply brushing, jarring or shaking—even by a light puff of air. Then try the same experiment with powdered graphite and observe that the more one rubs the more effective the lubrication. It is adhesive in the highest degree, it stays put, and there is absolutely no waste—every particle is an active lubricating factor and it is not, like the flake product, easily removed from the bearing or surface to which it is applied, but, on the contrary, as demonstrated in the foregoing experiment, its lubricating efficiency increases under heavy frictional pressure. Then, too, since the function performed by graphite when used as a lubricant is to fill in and even up those irregularities or inequalities of microscopic minuteness, which occur even in such carefully finished bearings as appear perfectly smooth to the naked eye, it would seem that the graphite which will best accomplish this mission must be of a microscopic degree of fineness, that is it must be fine enough to become deposited in and fill up these microscopic depressions above referred to, so the inference is that it would be quite as easy for a camel to pass through the eye of a needle as for flakes of graphite which are visible to the naked eye to deposit themselves in these minute inequalities which can be detected only with the aid of a powerful microscope, and which are present to some extent in even the most carefully finished bearings. It will be seen on the other hand that the powdered form of graphite is sufficiently finely divided to easily perform this function, and besides is of such an adhesive nature as to stay in them and continue its work indefinitely.—The United States Graphite Co., H. C. Woodruff, General Manager.



A MIDGET FRENCH FOUR-CYLINDER CAR

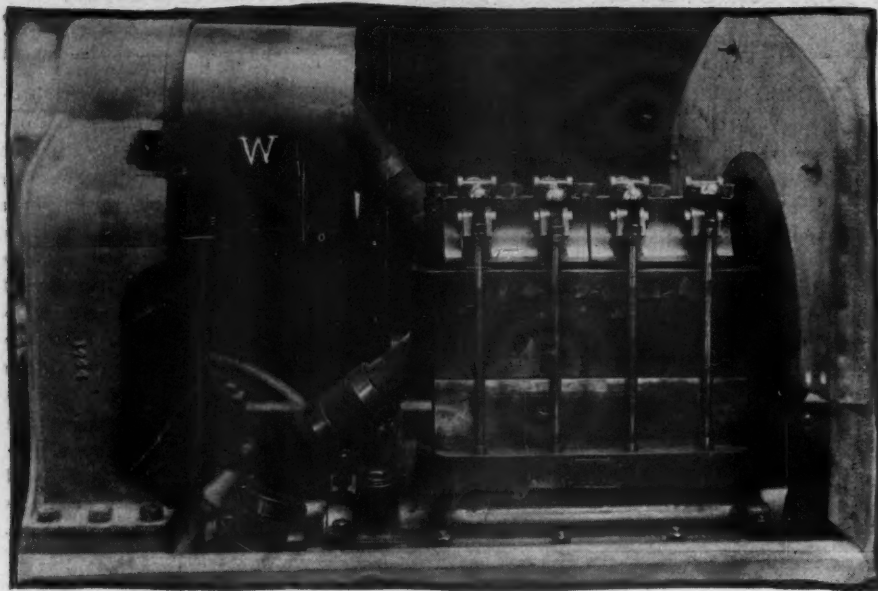


FIG. 1—FOUR-CYLINDER SIZAIRE-NAUDIN MOTOR

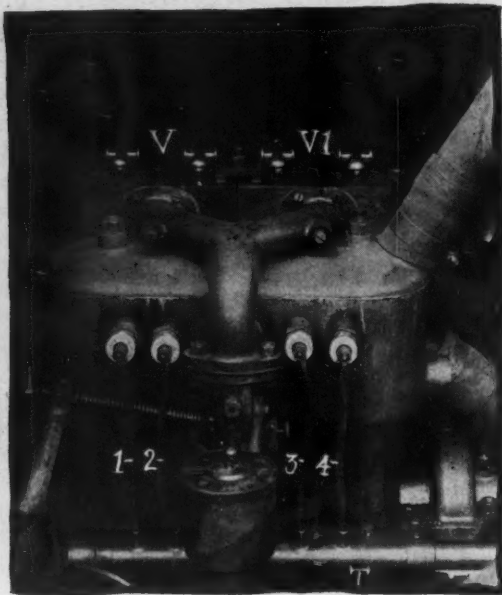


FIG. 2—THE MAGNETO CANNOT BE SEEN

AFTER developing the one-cylinder to a wonderful degree of efficiency, French small car builders now are showing a decided preference for four-cylinder motors of very small volume and low or moderate power. An example of this is to be found in the conversion of the firm of Sizaire-Naudin to the multiple-cylinder idea, after several years devoted exclusively to the development of the one-cylinder. The new production will be examined with particular interest from the fact that the firm has met with phenomenal success in the single-cylinder class, and has produced single-cylinder racers with a ratio of stroke to bore which a few years ago would have been declared impossible. With a bore limited to 3.9 inches, the firm has shown how

to make a nominal 8 horsepower develop 26 horsepower and break all speed records for its class. Part of the secret resided in a stroke of practically 10 inches, excessive valve diameter, light reciprocating parts, efficient lubrication and the use of the right metals.

The new four is the outcome of racing and touring experience with mono-cylinder motors. Nominally, it is of the same power as the firm's single-cylinder model and can be fitted under the same bonnet without any structural changes. The four-cylinders have a bore and stroke of 70 by 120 millimeters—2 7/10 by 4 7/10 inches—and though rated at 12 horsepower has developed as high as 26 in a 10 hours' bench test. The bore is long in relation

to the stroke, but is short in comparison with a second motor already designed and tested on the road, and intended for next season's market, in which, for the same bore, the stroke is carried up to 170 millimeters, or 6.7 inches. This is the greatest ratio of stroke to bore that has ever been attempted on a car designed for the ordinary user.

Block Casting of Cylinders

Block casting of the cylinders, thermosyphon water circulation, high-tension ignition with fixed sparking point are all modern features which have been adopted on the new Sizaire-Naudin. A distinctive feature is that the crankcase is divided into two parts, H and H1, Fig. 3, vertically, and not horizontally, the halves being bolted together, and each one carrying a ball-bearing B for the crankshaft, as in single-cylinder design. Naturally, there is no central bearing, but this cannot be considered a novelty in view of the fact that most constructors of small motors have decided that two bearings only are preferable. The use of ball bearings for the crankshaft, however, is new, Sizaire-Naudin being the only French maker of small motors to use other than plain bearings for the crankshaft. They have been led to this move by their experience with the high-powered, 100-millimeter, single-cylinder racing motors, all of which had ball bearings throughout.

The camshaft, Fig. 4, is mounted on ball bearings, and is machined out of the solid with integral cams. Although all eight valves are mechanically operated, there are only four cams C1, C2, C3 and C4 for the entire set. The valves are superimposed, the inlets being inverted over the exhausts, and all having a diameter of 50 millimeters—1.96 inches—compared with 70 millimeters—2.75 inches—for the cylinder. This is a much larger valve diameter than would

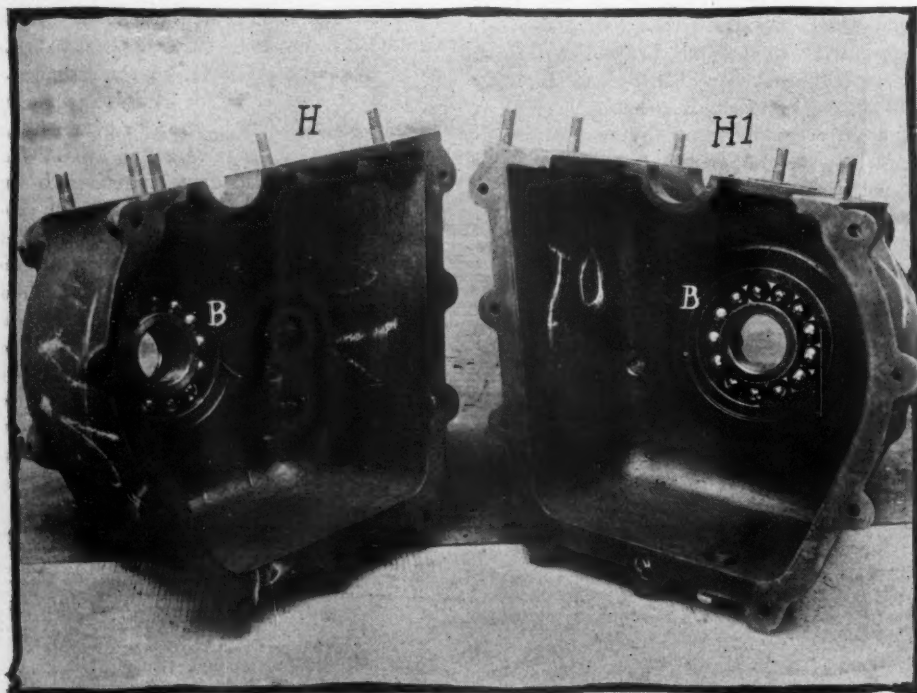


FIG. 3—THE CRANKCASE IS DIVIDED VERTICALLY INTO HALVES

be possible with the valves side by side on such a closely-set motor. The exhausts are operated from below by tappets, according to standard practice, the only distinctive feature being a considerable lead to the exhaust opening.

Other Features of Motor

Parallel with the camshaft, but on a slightly lower plane, is a fixed shaft on which are mounted four small rockers, one end of which comes in contact with the face of the cam, while the opposite end touches the intake valve tappets. The rocker arm is made to follow the profile of the cam by reason of a spring on its under face, just below the tappet. A spike-like projection on the tappet centers the spring, the lower seating of which is on the upper face of the crankcase. Holes are bored in suitable positions on the face of the crank-chamber to receive these projections when this end of the rocker arm is depressed. Considered in a vertical plane, the camshaft has above it the exhaust valve tappet, and below it the small rocker arm operating the inlet valve tappet and the inlet valve by means of a vertical push rod, and an overhead rocker arm.

The overhead mechanism is the one that has been applied to single-cylinder models since the commencement, and has only been modified in detail for the new work it has to perform. On the cylinder head is bolted a steel housing which also serves as intake manifold. It is in two parts, V and VI, Fig. 2, each one receiving two valves, and is held down by five bolts. A lip is formed on the outer face of the housing, under which is slipped the lower bar of a steel link, the upper bar of which receives the rocker arm. At each end of the rocker arm is a socket, into one of which the extremity of the intake valve is received, while the other receives the ball end of the vertical push rod. The extremity of the pushrod is threaded onto the main portion and locked with a couple of nuts, thus allowing for adjustment. The

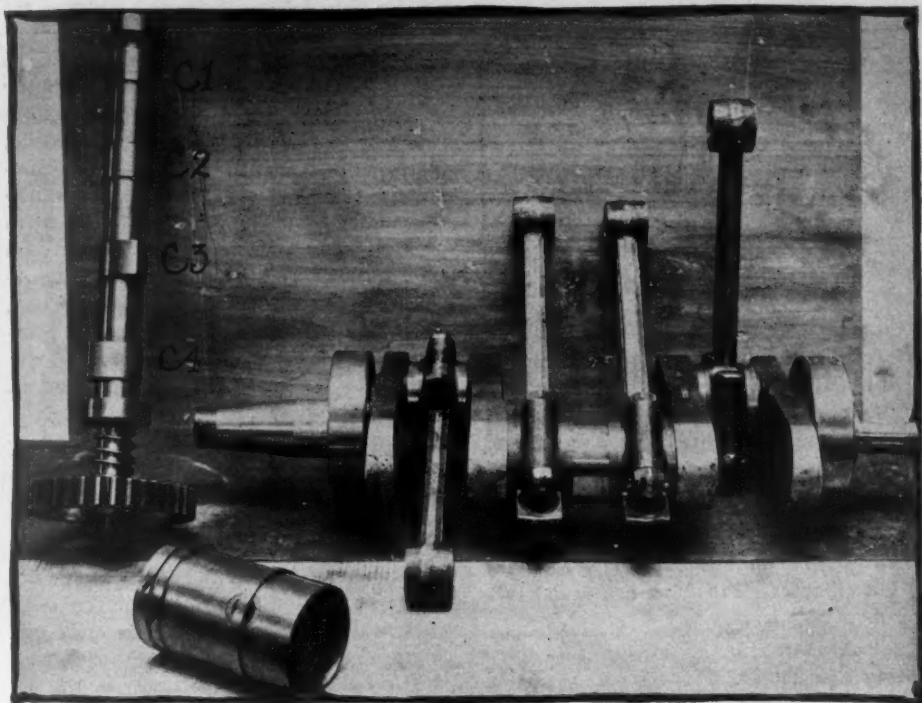


FIG. 4—CRANKSHAFT AND CAMSHAFT ARE BOTH BALL BEARING

exhaust valve springs being hidden by a moveable steel plate, the only visible parts in movement are the vertical pushrods and rocker arms.

Location of Magneto

A high-tension Bosch magneto is relied on for ignition. On this model it is in a very low and inaccessible position, driven by external gears. It has been decided, however, to raise it to the level of the frame members for more convenient examination. The instrument is a new model, Fig. 6, just produced by the Bosch company and remarkable for its small size. It is of considerably smaller size than the one employed on the single-cylinder models and is provided with glass inspection plates for verifying the contacts without dismounting. The leads pass through a straight

metal tube T, Fig. 2, level with the base of the cylinders until they come opposite their respective plugs, from which point the insulated cable is passed up to the sparking plug. The only visible wiring therefore consists of four vertical lengths, 1, 2, 3 and 4. At present a Zenith carburetor is employed, but will be changed later for one of the firm's own design.

Unusually large diameter inlet and outlet pipes are used for the water circulation. The supply of cooling water is contained in a plain vertical-tube radiator, at the back of which is a large-capacity brass tank, supplying a good head of water for the cylinders. The tank is only secured at the forward end, where it enters into the head of the radiator, to which it is riveted and brazed. A ventilator fan is not em-

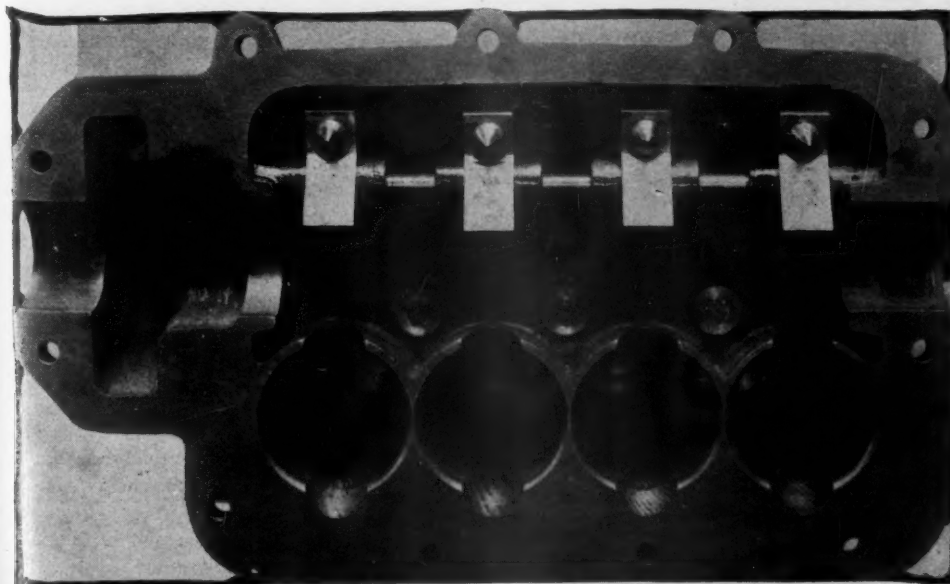


FIG. 5—THE CYLINDERS ARE CAST IN ONE



FIG. 6—MIDGET BOSCH MAGNETO

Houdaille Wheel

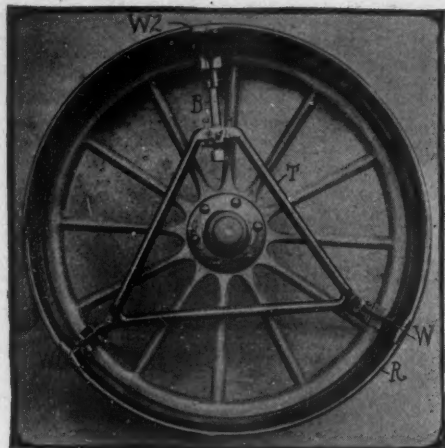


FIG. 1—HOUDAILLE SPARE WHEEL

ployed on the French models, but will be fitted where the car is intended for service in hot climates. Provision has been made for mounting it.

Splash is relied on entirely for lubricating the motor, the oil being carried from a dashboard lubricator to the rear bearing of the crankshaft, from which point it falls into the crankchamber. Both gasoline and oil tanks are carried on the dashboard, the former being in front and the latter just behind it.

Chassis features of the four-cylinder model are identical with those of the single. Suspension in front is by means of a transverse inverted semi-elliptic spring mounted above a special type of front axle. A single-plate clutch is employed, and the drive is taken direct from this point to the rear axle without passing through a gearbox. There are three forward speeds and reverse, all but the reverse giving direct drive through spur instead of bevel gears. Rear suspension is of the three-quarter-elliptic type. Fitted with a two-seated body a speed of over 50 miles an hour is guaranteed with this small car.

Peugeot Patent

The Peugeot company has secured a French patent for a carburetor improvement consisting of a small diameter vertical tube mounted on the lead from the float chamber to the vertical nozzle, the tube being open to atmospheric pressure. It is claimed that with this device the low level of gasoline necessary for running the motor light without overflowing at the nozzle, can be obtained without danger of starving the motor at high speeds. The fuel in the vertical tube, being a comparatively small quantity, is put into motion much more rapidly than the larger quantity in the float chamber, with the result that the nozzle is fed quickly. Without this device the fuel does not always respond to the successive suction as quickly as is desired, with the result that starving takes place. In other words the Peugeot tube prevents variation in height between the gasoline in the jet and that in the float chamber when the motor is run at high speed.

Since the day when the Davies Brothers put the Stepney emergency wheel on the English market, there have been numerous copyists in various parts of the world. Most of these have merely sought to produce a spokeless wheel which, as in the case of the Stepney, would allow the car to be run home without work on the tires after a puncture. The Houdaille, just produced by a French firm, claims to have a wider field of usefulness, for as it is secured to the outside of the rim, and not hooked to the inside, it can be attached whether an inflated or a deflated tire is in position. This allows it to be used temporarily where a non-skid is required on a car, the four wheels of which are shod with smooth tires. It allows of twin tires for the rear when a temporary heavy load has to be carried, and it further allows old covers to be used up in pairs for town work which would certainly burst if run singly over country roads. The makers attach considerable importance to the device as a commercial accessory, for on delivery vans it frequently happens that a car has to be overloaded in a manner that is apt to be injurious to its tires. If the Houdaille wheel is added with the extra load the weight is carried better and the covers do not suffer.

As in all other devices of this nature, the Houdaille consists of a steel rim R, Fig. 1, without spokes, on which a fully-inflated tire is mounted ready for use in case of emergency. Its individuality lies in the method of attachment. There are no permanent lugs to the rim, with jaws for clamping to the road wheel, but in its place a steel tube triangle T, at each angle of which is a forged steel wedge W of special shape. Two of the wedges W and W1 are pivoted to the angle of the triangle, but the third W2 is secured by a strong bolt B screwing through the body of the frame, and entering into the wedge.

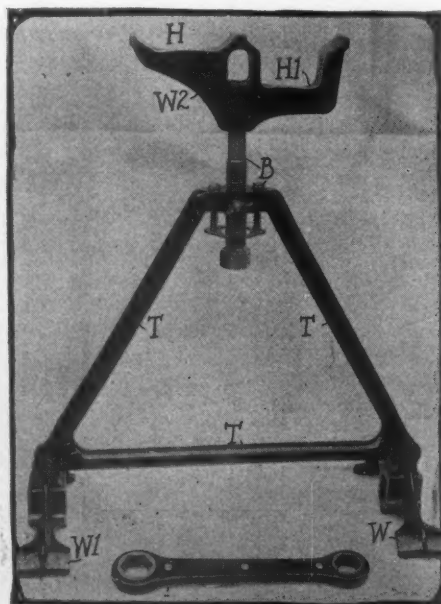


FIG. 2—HOUDAILLE WHEEL FASTENER



FIG. 3—TIGHTENING HOUDAILLE SPARE WHEEL

The shape adopted for the wedges, Fig. 2, is such that one-half H presses against the inner face of the movable rim, and the opposite half H1 against the corresponding portion of the fixed steel rim. It is shaped in such a way that it enters between the spokes of the wheel and surrounds the wooden felloe. When in position and screwed up by means of an ordinary spanner, pressure is applied to the two rims at three different points on their circumference. A couple of studs project from the face of the spokeless rim and thus act as an additional precaution against the wedges slipping. In reality the rim becomes a wheel with three spokes, and is almost as solid in construction as one of the car wheels. When once the pressure has been applied it is impossible for the wheel to slip unless the pressure is relaxed, and this is prevented by a suitably-shaped plate fitting over the head of the bolt, secured there by two springs, and further held by a thumbscrew. When not in use the spare wheel can be attached to a special triangular carrier designed for that purpose and secured to the side of the car, or the triangular attachment can be dismantled, and the whole carried in the same way as a dismantlable rim.

The Flash Decarbonizer

The Flash Mfg. Co., Painesville, O., is marketing the Flash decarbonizer, a compound dissolvent in dry form for preventing and removing carbon deposits from gasoline engines. The dissolvent is aerated by the combustion in the cylinder and the vapor is claimed to absorb the carbon deposit.

Continental Quick Detachables

The Continental Caoutchouc Co., New York, announces it is now marketing quick detachable tires, that is tires with a hard-nonextensible bead, which are designed to be used without lugs on quick detachable rims. These quick detachable tires are made with a round tread, the heavy flat tread, and the anti-skid tread with steel studs. These tires are made in all the sizes in which the regular continental tires are supplied at present.



Development Briefs

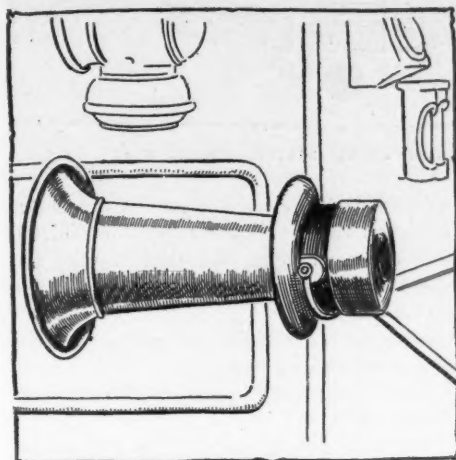


FIG. 1—MONOPLEX ELECTRIC HORN

Monoplex Electric Horn

THE Atwater Kent Mfg. Works, Philadelphia, Pa., has placed on the market the Monoplex electric horn, which is a brass one 11½ inches long and having a black enamelled base, containing a 5-inch diaphragm which is vibrated by an electro magnet, the vibrations causing the sound. This horn may be attached to the dash of any car by means of a bracket formed integrally with the base. The horn is operated by a push button, which may be mounted on the steering wheel.

New Lava Burner

The American Lava Co., Chattanooga, Tenn., has marketed a new acetylene burner known as the Alco Deluxe burner. Its pillars are turned from solid brass and are nickel-plated. The burner is screwed into a thread on the top of this pillar, and then cemented in place in order to avoid leaks. The burner is made of Nuremberg steatite. The base of the burner is hexagonal, permitting of either pliers or wrench for installation.

Valveless Inner-Tube

The Valveless Inner-Tube Co. is marketing an article in the tire line which was invented to overcome the vexatious troubles caused by punctures. It consists of two different textures of rubber. The outer wall of the tube is of regular tube construction, while the inner wall is a vulcanized layer of an adhesive compound which closes around any object that might puncture the tube and fills the hole when the object is withdrawn. The compound, it is claimed, retains its adhesive character throughout the life of the tube. On account of its double wall construction the Valveless inner tube is inflated by a special inflating needle which fits any pump. The needle may be forced through the outer casing of the shoe, if desired, or it may be inserted through the sleeve in

the rim, thus obviating the necessity of driving the needle through the tough outer casing. It is claimed that these tubes have taken all kinds of abuse and have been subjected to every conceivable test, and have stood up beyond the expectations of their makers.

Hyray Electric Lamp Outfit

The Electric Storage Battery Co., Philadelphia, Pa., has brought out the Hyray electric lamp, designed for headlights, side lights, or tail lights. The lamp is furnished in japan or brass finish, and its fittings have been designed so that the lamp can be attached to the standard types of oil or gas lamps now in use. The

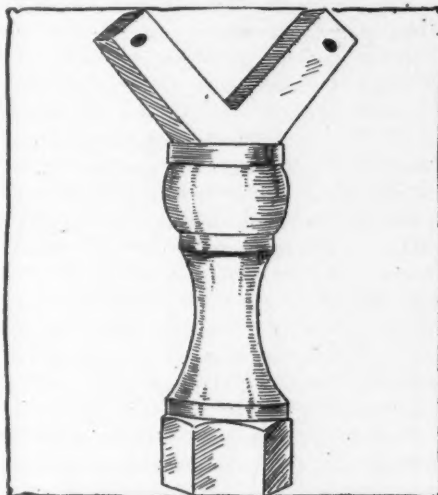


FIG. 2—ALCO DELUXE BURNER

current is furnished by an Exide battery carried on the running board of the machine. Switches are provided for controlling the lights.

Combat Magneto Battery

The Hall Storage Battery Co., Cleveland, O., has brought out a new type of battery known as the Combat magneto type. It is designed for use in conjunction with a magneto so that starting on compression may be used. It is claimed to be particularly compact, occupying less space than two dry cells and not weighing 7 pounds. In its make-up the regular Combat hard porous plates, non-slopping vents and non-corroding terminals are used. It is made in 4 and 6-volt series.

Manzel Automatic Lubricator

Charles W. Manzel, Buffalo, N. Y., manufactures the Manzel valveless mechanical oiler, which is made in all sizes for any different number of feeds. It consists of the usual bank of plunger pumps, the plungers being actuated twice to each revolution of the valve shaft. This is accomplished by double-acting cams, which impart an up-and-down movement to the crosshead extending through the plungers, so movement is given only while the slot

on the valve shaft is connected with the ports in the pump cylinder and remain idle while the cam roller is moving through the dwell on the cam ways, until it reaches the next port. On the suction stroke of the plunger the oil flows through in inlet tube and through a port in the shaft to a semi-circular channel into the cylinders. On the first discharge stroke the oil flows through the drip nozzle of the sight feed; on the second suction stroke the oil flows from the drip cup back into the cylinder; and on the second discharge stroke the oil is sent to the bearings. The second suction stroke is greater than the first, so that overflowing in the drip feed in the sight is not permitted. Thumb screw adjustment is furnished to regulate the amount of oil pumped.

Rivetless Chains

J. S. Bretz Co., New York, has taken the selling agency of the rivetless chains manufactured by the Rivetless Chain and Engineering Co., Lebanon, Pa. The chain is a drop forged one and has been extensively used in mining and other businesses, and will be manufactured in sizes for motor car uses.

Baldwin Road Guide

The Baldwin Mfg. Co., Boston, Mass., markets the Baldwin route guide, which is contained in a cylinder 6 inches long and 3 inches in diameter, and is mounted beneath the steering wheel. Within this cylinder the printed route sheets are attached to reels much in the same way as the film in a camera. At one end is a finger wheel by which the printed directions may be turned as required, the paper being transferred from one reel to another as the run progresses. Illuminations are furnished for night work.

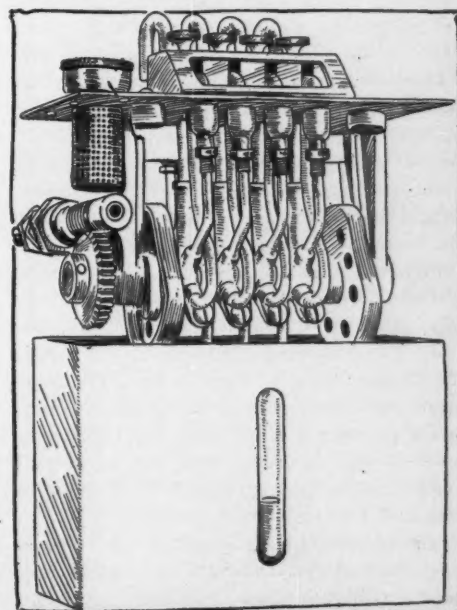


FIG. 3—MANZEL AUTOMATIC LUBRICATOR

CANTING PROPENSITIES OF CAR BODIES

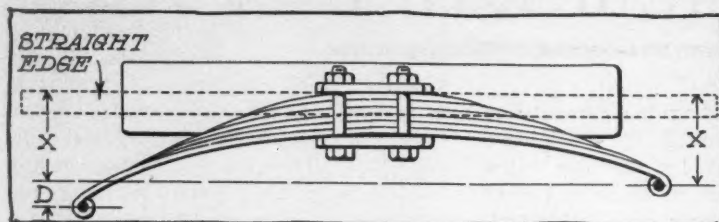


FIG. 1—STRAIGHT EDGE SHOWS CANT

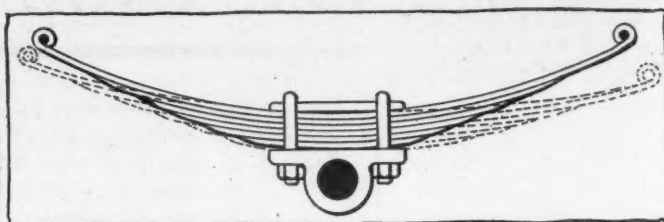


FIG. 2—EFFECTS OF POORLY-FITTING SPRING SEAT

MANY have noticed that if they viewed their cars from either directly in front or back, they found that the body canted or tipped to one side. In some cases the deviation from the level is so slight that it cannot be detected, whereas in others it is so great that one detects it while riding in the car.

Some will say, "Any car will tip to the right after having been run awhile because of the fact that that side is always loaded heavier than the other side." They call attention to the driver sitting always on that side whether there is anyone else in the car or not, to the weight of the steering wheel and post, the battery box, extra tires and other things which often are carried on the right side and which have nothing to counterbalance their weight on the left side. It is assumed by some that on account of this unbalanced weight the very best cars on the market always will settle to the right side and that it gives no room for criticism of design or workmanship.

Some Deduction Made

That the above assumption is not justified is evidenced by the fact that some makes of cars are level almost indefinitely whereas others act contrary and show a tendency to tip to the left side. Consider some of the conditions which normally exist and see to what extent they affect the problem on hand. Assume that the driver weighs 200 pounds and sits alone in the car and on the right side as usual. Being almost directly over the right member of the frame, his weight may be considered as carried by the springs on that side alone, perhaps equally divided between front and rear. As a rough estimate, allow 50 pounds for the weight of the steering wheel, post, shifting levers and attachments which may be considered as supported on the right springs alone. For extra tires, storage battery and generator carried on the right running board, allow perhaps 80 pounds. If it be assumed that these latter weights are twice as far from the center of the car as the springs are—one and one-half times the distance from the left springs that the right ones are—it will be seen that the additional load on the right springs will be one and one-half times 80 or 120 pounds.

In addition to the above dead weights, the reaction from the driving torque may be considered. The average maximum torque which a 30-horsepower engine will

By M. R. Wells

develop is approximately 100 pounds acting at a 1-foot radius. This reaction will take as much load off of the left side as it puts on the right side since it is due to a twisting action and not a dead weight, consequently if the springs be considered as $2\frac{1}{2}$ feet apart, the maximum torque on direct drive will add 40 pounds— $100 \div 2\frac{1}{2}$ —to the load of the right side and take the same amount off of the left. It must be remembered, however, that the torque of the engine really is not the determining factor if the transmission gear is carried on the frame but instead it is the torque transferred to the driving or propeller-shaft. If the speed reduction on low gear is one-to-four, the driving torque will be four times that of the engine or 400 foot-pounds. The difference in loads on the springs when the engine is developing full power or torque and the low gear is in, is four times 40, or 160 pounds.

Perhaps an attempt should be made to estimate the effect due to the curvature of the road's surface. As a matter of fact, however, a driver naturally seeks the level portion of a road and is able to keep it except when passing some other vehicle. Even when forced to drive close along the right gutter, the car is thereby tipped so little that with the center of gravity of the car as low as is usual the amount to

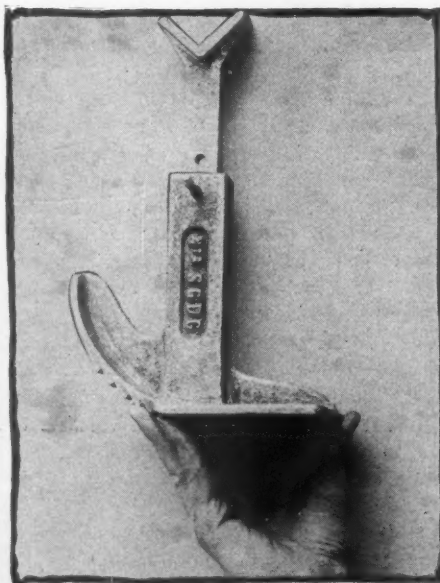
which it is thrown to one side of the center is very small and may be overlooked, unless the road is so bad that it does not deserve the name. By adding all of these estimated amounts one finds a total of 530 pounds, to be divided between the front and rear wheels, say roughly 265 pounds more on each right spring than its proper share.

But even admitting that the springs are thus unevenly loaded, is it any excuse for a permanent settling of them? No! In the first place, every designer should consider these things and make proper allowance for them. Every car is liable to run over an obstruction at some time or other which will cause the bumpers to come into action, therefore shouldn't the springs be so proportioned that they will undergo this deflection, obviously the maximum, without submitting any fiber to a stress greater than the elastic limit of the material from which it is made? Assuming that the answer will be in the affirmative, consider some of the other phases of the question. At what part of the car's life is the canting to one side most noticed? Contrary to what some may expect, the writer is inclined to say when the car is new rather than old. Perhaps the reader will argue then that if this be true, it is because the owner looks for faults in a new car more than he does later, but there are other reasons than this.

Scales Make Springs Stiffer

Experience from testing many springs has shown that if the surface of the spring has not been ground off after it has been tempered, there is apt to be a certain amount of scale left which makes the spring stiffer the first few times it is loaded than later after this surface scale has been broken up. If a car has been equipped with springs which were not ground, it is natural to expect that the right-hand springs, which we have seen normally carry the greatest load, will be the first to settle a certain amount and cause the car to list slightly to the right. Continued use, however, should before long break up the scale effect on the left-hand springs and cause the car to come back to the level position.

Another thing which materially affects a spring when new is the friction between the various leaves. With a new car, there is a certain amount of paint which has worked in between the leaves and into the various joints, thus causing a sluggish ac-



GODIN'S FOOT JACK

tion at first. When making the final inspection of cars just prior to shipment, the writer often has noted this tendency to lean to one side and in the majority of cases has been able to level the car up again by stepping alone on the higher running board and jumping a few times. In other cases, it has been necessary to get one or two others to assist in rocking the car well to one side.

Some Tendencies

At best, the surfaces of any new spring whether ground or not, are not in the condition they will be after having been ridden several hundred miles. As in the case of springs having originally the surface scale referred to above, this difference in the smoothness and hence the friction, will tend to cause the right-hand springs to take on their final polish and allow the car to lean slightly until the left side springs eventually reach the same condition. The mere fact that one should expect a certain tendency to tip to one side, should not prevent proper investigation further as the following will show.

On one very popular make of car, the agents continually called attention to the fact that the cars tended to tip to the left. Although contrary to what they might expect, the makers were at first inclined to assume that it was due to some unequal distribution of weight. Not being satisfied with this assumption, however, the writer investigated further and found that the spring-hanger—the car had three-quarter-elliptic springs—on the left side of practically all the frames on the assembling floor tipped forward more than the one on the right side. This led to an investigation of the jigs which were found to be the cause of the trouble.

On another make of car having platform springs in the rear, the general tendency was to cant over to the right, but occasionally it was to the left instead. By placing a straight edge across the spring hanger in the rear, it was found that in a great many cases, the distance between it and the center of the eye—Fig. 1—was less on the right than on the left by a certain constant amount. Where the car tipped to the left, the straight edge showed that



USING GODIN'S JACK

the left side was less by the same amount that was usually the case on the right. This fact suggested that perhaps the springs were not symmetrical when received from the makers, but the writer never had the opportunity to follow the matter up. It would seem possible that the form over which the spring maker bent the leaves was not true, that one end of the spring was formed while the steel was good and hot, but that it had cooled considerably before the other end was pulled down to the form, thus causing it to spring back more when released, or that in quenching, the spring had been held in such a position that it tended to warp to a certain extent.

Spring-Hanger Off Center

In other cases, the writer has found springs with the hanger unintentionally set off center, thus distributing the weight unevenly. Occasionally one finds a weak spring-hanger which bends and causes a settling to one side. In other exceptional instances, it is found that a weak frame is the guilty member.

Where the springs are very light, a poorly-fitting spring seat, Fig. 2, may, when the clips are tightened, cause one spring to

straighten out more than the one on the other side and thus cause a tipping action.

In many cases, what has appeared to be a settling of the springs to one side, has really been an optical illusion. For instance, a lop-sided front axle as shown exaggerated in Fig. 3, the dotted line being horizontal, or a top or perhaps the stuffing in the trimming being mashed down more on one side than the other, will make the car appear as if tipped considerably to one side. Some makers have considered the advisability of making the right-hand springs stiffer than the left, but the majority have seemed wise enough to stop after considering it and never have put the idea into practice.

NEW FRENCH IDEAS

A jack that only requires a touch of the foot to raise a car has been produced and patented by Engineer Godin, a Frenchman. It is an all-metal instrument without any gearing, the height being varied by securing the moveable stem by holes in the body with a strong pin. It has a strong, broad metal foot and cast with it a semi-circular foot with transverse notches. When it is required to raise the car the jack is placed in an inclined position under the axle, or other suitable part, the curved foot resting on the ground, and the upper fork touching the under side of the axle. The foot of the operator is placed on the flat portion of the jack, pressure applied, and at the same time the car pulled forward gently, when the jack will assume a vertical position and the vehicle be raised from the ground. To lower the car it is only necessary to push it gently, the curved foot of the jack preventing a too sudden drop.

For small and medium-weight cars the jack is an advantage over the gear-operated type, for it can be constantly maintained at the correct height, it is quicker to operate, and it costs less to manufacture. It has its limitations when applied to very heavy closed cars, for here the effort necessary to draw the car forward is apt to be too much for one man. The jack, however, is strong enough for the work.

Renault has secured a lubrication patent, the object of which is to provide for the automatic oiling of the rear axle. The gearbox is connected up to the universal housing immediately in its rear by a slightly flexible shaft, thus maintaining a constant level of oil in the two organs. Within the upper portion of the universal housing is a suitably shaped oil-collector, into which a certain amount of oil is splashed by the revolving universal joint. The collector delivers the oil into the tubular housing of the propellershaft, through which it flows to the rear bearing of the shaft and finds its way into the differential gears. Provision is made against leakage, and a further provision of the patent provides for a fixed instead of a flexible oil lead from the gear box.

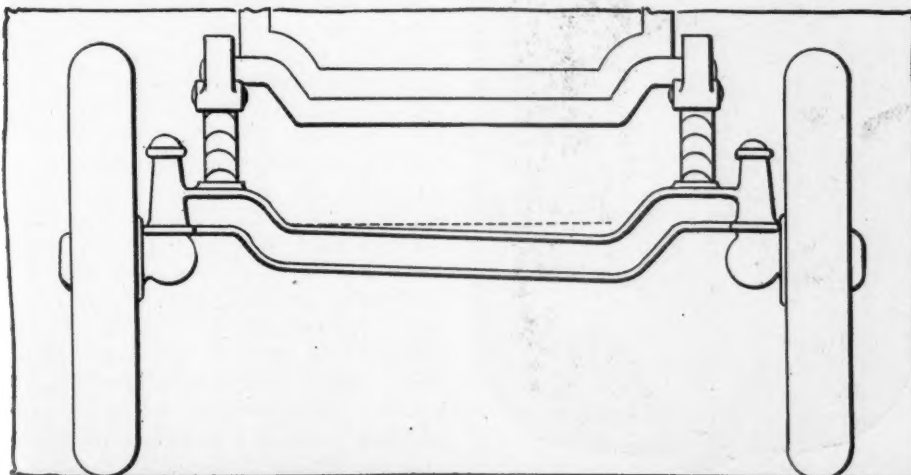


FIG. 3—AN OPTICAL DELUSION ILLUSTRATED

From the Four Winds

Alco Joins M. C. A.—The Manufacturers' Contest Association has added to its membership list the name of the American Locomotive Co.

Issues Road Warning—Chairman Griffith, of the Automobile Club of Philadelphia's route and tour committee, warns motorists traveling between the Quaker City and Trenton, N. J., to avoid the toll road route via Trappe, and to select the old Hulmeville road instead.

Bridgeport Books Climb—The fifth annual hill-climbing contest of the Automobile Club of Bridgeport, will be held May 30 at Bridgeport, Conn. Preparations are being made for this event, additional safeguards will be provided for both spectators and contestants. There will be bridges at the most dangerous turns and state militia to guard the course.

New Trade Body—About 100 manufacturing and wholesale concerns of Indianapolis have organized the Indianapolis Trade Association for the purpose of boosting that city as a business center and to devote its efforts toward obtaining the best freight rates and shipping service possible. Among the charter members are the Cole Motor Car Co., the Waverley Co., Wheeler & Schebler, Willys-Overland Co., Premier Motor Car Co., Diamond Chain and Mfg. Co., Overland Automobile Co. and Buick Motor Co.

Gathering Road Information—The Automobile Club of St. Louis is arranging to collect touring data for the benefit of its members on a scale much more extensive than it ever before has gone into the problem. Large colored road maps of Missouri and adjoining states will be published soon. These maps will be more comprehensive from a local viewpoint than those to be furnished by the Automobile Club of America, although the latter will be used as a basis for the ones to be published by the St. Louis club. The club also is planning to send out motor route survey cars through Missouri and the entire southwest.

Good Road Samaritans—The Good Roads Contracting Co., of Spokane, Wash., has filed articles of incorporation with the secretary of state. The company is formed for the purpose of bidding on the roads to be built in Spokane county during this year, and its incorporators are privileged to buy, sell or lease land and build public and private roadways. The capital stock of the company is \$10,000, divided into shares of \$100 each. It is understood that the company is formed for the purpose of taking contracts for road work at a profit of not more than 7 per cent on the investment, and that the same persons who are at the head of the Spokane County Good

Roads Association are also directing the affairs of the contracting company with a view of giving the county the greatest value for every dollar expended.

E-M-F Official Car—Chairman William Moge, of the Norristown Automobile Club's contest committee, has selected the E-M-F as the official car in the club's endurance run to Scranton, Pa., May 18-19.

Bisons Want Clubhouse—The Automobile Club of Buffalo is preparing plans for a clubhouse for its members. The committee in charge of the new project is seeking for a suitable site. It must be within 15 miles of the city. What the house will cost has not been definitely decided. The grounds will be of at least 10 acres area.

Postmaster Converted—For some time past the Buffalo postoffice has been experimenting with the use of motor cars to collect the mail from the boxes and sub-stations. This has proved very successful. The only drawback is the bad condition of the streets in the wintertime. If the appropriation for the Buffalo postoffice is large enough motor cars will be continued in the service.

New Rate Allowed—A new rate applying to the North Pacific coast points took effect March 22. The minimum weight on 50-foot cars has been changed from 14,200 to 12,000 pounds. On 36-foot cars the minimum rate is still 10,000 pounds and the rate of 11,200 pounds on 40-foot cars also remains unchanged. The matter of advancing rates in the official territory from first class to class and a quarter on carload lots is being discussed by the railroads. They also have under advisement the plan of rating less than carload lots at two and one-half times first class. This

is based on actual weight with a minimum of 2,000 pounds. It will mean a difference of at least \$30 on the price of cars set down in the North Pacific coast cities.

Buffalo Police Order—Chief of Police Regan of Buffalo has ordered his Main street patrolmen to see that motor cars come to a stop at crossings where passengers are getting aboard or alighting from street cars. The police officers are directed to arrest drivers who do not comply with the order to stop.

Want Some Fun, Too—The Reading Automobile Club, of Reading, Pa., is arranging for its first annual endurance run, the date for which has not yet been decided upon. It is the purpose of the Readingites to inject as much pleasure as possible into the affair without detracting from its value as a competitive event.

Offers Sherman a Car—Believing that an injustice was done Vice-President James S. Sherman and the high position which he holds when the house of representatives voted against the bill appropriating a motor car for his official and private use, President Benjamin Briscoe, of the United States Motor Co., has offered Mr. Sherman the use of a Columbia car in Washington.

Another Illinois Club—The Champaign County Automobile Club was organized at a meeting held in the rooms of the chamber of commerce at Champaign, Ill. Thirty members enrolled on the charter. It is expected to have a membership contest in a short time and hopes are entertained for a membership of upward of 200. One of the objects of the club is to teach members how to handle cars for the safety of pedestrians. The club also will assist in the prosecution of motorists who violate state laws. Officers elected were as follows: President, Edwin S. Swigart; vice-president, Jesse Kirkpatrick; secretary, C. H. Johnston, and treasurer, W. P. Spaulding.

Road Boom in Ohio—Stone road improvement bonds have been sold at Napoleon, O., by the county commissioners of Henry county amounting to \$49,500. The constructive work for 7 miles of road in Marino township has been awarded for 3 miles in Richfield township and Monroe. At Toledo the county commissioners recently awarded the building of a stone road 3 miles in length for \$22,210. Three large contracts for stone roads also were awarded at Bowling Green, O. Near Sandusky the contract was awarded for the straightening out and improvement of the snake road in Margheretta township, admittedly the crookedest road in the state of Ohio. There is a large amount of road improvement under consideration and it is certain that this year will witness the



LOS ANGELES TRACK PRIZES

expenditure of much greater sums of money in road building in northwestern Ohio than ever before in the history of the state.

Flag-to-Flag Date—Monday, May 2, the flag-to-flag endurance and reliability contest starts from Denver for the City of Mexico for the G. A. Wahlgreen trophy.

Doctors Form a Club—The Physicians' Motor Club of Philadelphia, a new organization with seventy members, will have its first smoker at the Hotel Walton next Friday night. Edward Wilkie will give a talk on the "A-B-C of the Motor Car."

More Members for Bisons—The membership committee of the Automobile Club of Buffalo recently took favorable action on seventy-six applications of motorists desirous of joining the organization. The committee to locate a site for the proposed country clubhouse for the club is ready to receive propositions. It is expected that the home will be ready by midsummer.

Firestone Made President—Charles E. Firestone has been elected president of the Columbus Automobile Club. Norman O. Abey was elected first vice-president, Charles C. Janes second vice-president, and Herbert A. Mason treasurer. The members of the board of governors are: Perin B. Monypeny, Herman Hoster, J. H. Dodshon, Nelson J. Ruggles, M. J. Hanley and William M. Frisbie. Following the election the board of governors organized and elected Arthur M. Crumrine secretary for the coming year.

Beautiful Texas Drive—The Houston Automobile Club, of Houston, Tex., has announced as a pleasure drive this route: Main street to Crosby, Tex., a distance of 25 miles, down the east bank of the San Jacinto river to the historic town of Lynchburg, where the Houston ship canal and the San Jacinto form a junction. By ferrying here the motorist may take the shell road to Harrisburg, LaPorte, Deer Park and into the San Jacinto battle ground. This is where General Sam Houston defeated the Mexican general Santa Anna and won for Texas its independence. This drive is about 60 miles in extent and passes through beautiful timbered country, with occasional rice farms.

Russia Has an Engine Show—Consul-General John H. Snodgrass, of Moscow, suggests that American manufacturers of motors should be interested in the international exhibition of internal combustion motors, being organized by the Imperial Russian Technical Society of St. Petersburg, to be held in that city for 6 weeks, beginning April 17, 1910. The exhibition is divided into the following sections: Motors for agricultural purposes; motors for farmers and for small industries; motors for locomotion, navigation, railways, tramways, aviation, motor cars, etc.; details and accessories of motors; technical literature, drawings, diagrams, etc. The managing committee is composed of ten



GRAVE OF THEY, GREAT FRENCH DRIVER

members from the mechanical department of the Imperial Russian Technical Society, and of other persons appointed by various organizations.

Garage for Sheriff—Kane county, Illinois, is one of the first counties in the state to make an appropriation for a garage for the use of the sheriff. It is to be erected on the grounds adjoining the county jail at Geneva.

Going At It Right—Co-operation of farmers and residents of Elkhart, Ind., in the bettering of conditions of country roads is asked by the industrial association of that city. In an endeavor to prove to every resident of the northern part of the county the benefit to be derived from good roads, the association will send out pamphlets to 10,000 persons giving statistics and facts to prove the need of such improvements. The booklet will tell of the different systems of road-making, the value of gravel and stone foundation and of the use of tar substance and oil.

Stops Smoking in Garages—Chauffeurs and all employees of garages will have to forego smoking while working in and about garages in St. Louis. Chief of Police Creecy has so decreed in an order demanding the enforcement of a city ordinance which has hitherto been virtually ignored. The order, which has been distributed to the various police districts, is in writing and is as follows: "One portion of the garage ordinances which must be strictly enforced is that prohibiting smoking in garages or other places in which motor cars are stored or stabled. Orders to break up this practice have been

telephoned from this office, but complaints continue to come in. Smoking in garages must be stopped, and it is up to the men who walk the beats to see that it is."

Balk at High Garage Rates—The Rockford Automobile Club, of Rockford, Ill., has taken a step toward making an united fight of the 500 motorists in the city against high rates charged by some garages. The club also is out for a larger membership and special efforts are being made along that line.

Will Exchange Courtesies—The Century Motor Club of Philadelphia has made a tripartite agreement with the Norristown Automobile Club and the Automobile Club of Delaware County for the exchange of courtesies. The Centennarians are arranging for a ladies' night on April 1, and about the middle or the same month a big smoker will be put on.

Syracusans to Feed—The annual banquet of the Automobile Club of Syracuse will be held in the Yates hotel, Syracuse, N. Y., tonight. The club has made rapid strides during the past year, having more than doubled its membership. It has also conducted a strenuous sign-posting campaign, putting out over 600 danger, road and route signs during the year.

Speedway Cards Prepared—The program for the race meets to be held on the Indianapolis motor speedway this season has been completed, the various meets to be as follows: May 27, 28 and 30; July 1, 2 and 4; August 12 and 13—24-hour race—and September 2, 3 and 5. The Wheeler & Schebler trophy will be contested for in a 200-mile race on May 28, and the Prest-O-Lite trophy, now held by a Buick, on May 27.

Oil for Connecticut Roads—Though it is not yet time to commence work on the Connecticut roads, the state highway commission has the repairs well planned so that with the opening of the season this work can be pushed along without delay. Connecticut's roads will be pretty well looked after as to dust this year. Oil will be used very generally. Last season considerable oil was sprayed over the various state roads with good results. Much objection was raised to it down Meriden way, but after it had soaked into the road surface thoroughly there were no complaints.

Good Roads Assured—The project of building a fine highway from Washington, D. C., to Alexandria, Va., is about to be consummated. The chambers of commerce of the two cities have appointed finance committees to raise a fund of \$20,000, to build the highway, and the Automobile Club of Washington is also endeavoring to enlist aid to bring about the construction of the road. Members of the club who are also members of the Washington chamber of commerce named on the finance committee are: President H. C. Hunter, Vice President John K. Heyl, T. B. Spence, L. D. Moore, Jr., R. B. Caverly, and W. H. Smith.

Current Motor Car Patents

Silencer—No. 951,770, dated March 8; to James M. Miller, Washington, D. C. As illustrated in Fig. 3, the muffler to which this patent relates is not unlike the conventional types now in use from outside appearances. Internally it consists of a series of concavo-convexed disks or cup members with deflecting surfaces arranged transverse the direct path of the escaping gases. There is a hole in the center of each disk, and the hole in each succeeding disk is smaller than the one in front of it, with the largest hole in the first disk with which the gas comes in contact. The gas enters at the opening A and as it strikes the protruding edges of each disk it is deflected outward through holes in the walls of each inner chamber B and following the course indicated by the arrows, passes out through the opening C.

Supplementary Rim—No. 951,533, dated March 8, to Gilford E. Kimmel, Rutland, Ind. This patent covers an attachment for vehicle wheels, by means of which a ready inflated tire may be attached to the regular wheel without the removal of the tire thereon. It comprises a spare-rim A, which may be attached to the regular rim, and held securely by arms B, as shown in Fig. 2. The arms B are provided with longitudinal slots to facilitate their manipulation. Dowel-pins P are employed to hold them in place, and bifurcated cams having lever members for their manual actuation are employed in connection with clamping plates and the bolts L to comprise the locking mechanism.

Rotary Explosion-Engine—No. 951,388, dated March 8; to Enrique J. Conill, Paris, France.—This patent relates to a rotary explosion engine of the four-cycle type, which has six revolving air-cooled cylinders. As indicated in the sectional drawing Fig. 1, a hexagonal drum B is keyed on to the shaft A. Six radiating cylinders are respectively secured on the faces of the drum opposite their combustion chambers N. A distributing plate R having ports adapted to register with the ports of the chambers N is provided. Inlet and exhaust pipes are connected to the distributing plate R and elastic means is

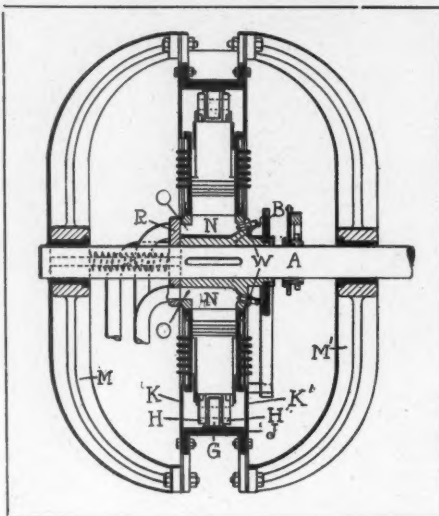


FIG. 1—ROTARY EXPLOSION ENGINE

provided to apply the distributing plate against the face of the drum containing the ports O. Spark plugs W are arranged in the chambers N. A roller G is carried by each piston on lugs H and H' which travels upon a path J of a form cooperating with the valve mechanism to force the pistons in and out to effect the suction, compression, expansion and exhaust of the gases in each cylinder. A rolling surface projects slightly from the roller path. Two sheet-metal plates K and K' are secured to the roller path, and the roller path itself is supported by the arms M and M' on which the motor shaft is journaled.

Piston-Pin—No. 951,181, dated March 8; to Anthony Duffy, Philadelphia, Pa. This patent relates to a piston-pin, which as illustrated in Fig. 4 is divided into two sections A and A1, both of which are mounted in the piston P. The section A1 is longer than the other and projects through the bearing of the connecting-rod. A spacer washer W having a curved surface positioned against the inner face of the piston and a flat face bearing against the connecting-rod and the end of section A1 of the pin, separates the two ends of the pin which are connected together by means of the screw S. The screw S passes through

the short section A of the pin, through the spacer washer W, and screws into the longer section of the pin A'. This construction would simplify casting.

Internal-Combustion Engine—No. 950,297, dated February 22; to George McDowell, New York city. This patent relates to an internal-combustion motor which has two power cylinders, and two compression cylinders for each power cylinder; and as both sets of cylinders are directly opposed, double-ended pistons are used throughout. The gas is compressed in the supplemental cylinders and then forced at the proper time into the combustion chambers of the power cylinders, which are provided with suitable inlet and exhaust valves. The pistons are rigidly connected to the piston pin, which works in slots in the sides of the cylinders.

Shock Absorber—No. 950,773, dated March 1; to B. B. Mears, Baltimore, Md. This shock absorber for attachment to a rear axle consists in a pair of spiral springs attached by chain linkage to axle housing and extending vertically therefrom to a cross spring extending between the side members of the frame and attached thereto by a short chain at each side.

Gardner Engine Starter—No. 950,848, dated March 1, to E. A. Gardner, Chicago. This self-starter is inserted in the propeller shaft of a car, the shaft being divided for this purpose. The starting is accomplished by a large diameter spring inclosed in a housing in front of the differential. A ratchet and pawl device is provided for connecting the inner end of the spring to the shaft so that the spring may be rewound by the motor.

Treating Iron or Steel—No. 949,575, dated February 15; to Henry Howard, Boston, Mass. This patent relates to a method of preparing iron and steel articles for tinning or galvanizing, which consists in subjecting the articles to an acid pickling process to remove the scale and thereafter passing an electric current to the cleaned articles connected as cathode in an alkaline electrolyte.

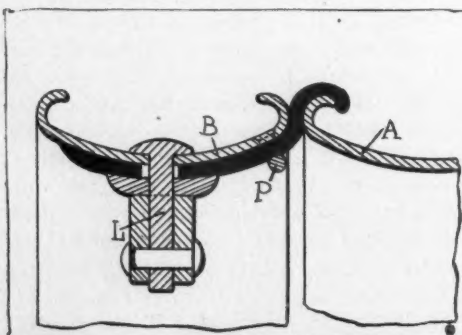


FIG. 2—SUPPLEMENTARY RIM ATTACHMENT

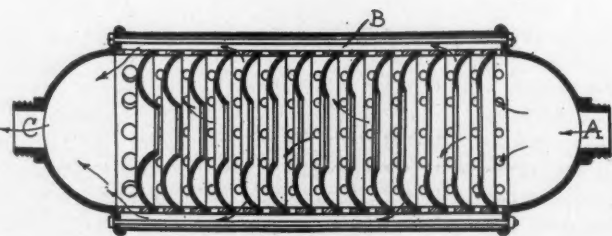


FIG. 3—A NEW SILENCER

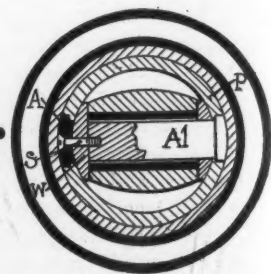


FIG. 4—A NEW TYPE OF PISTON PIN



The Motor Car Repair Shop



THERE are many young motor car repairmen whose wages will not permit them to equip themselves with all those tools which are only used occasionally, but there are a number of such tools which can be made from material taken from the scrap-heap, at no cost whatever, other than that of the time of the repairman. As the junior repairmen often have idle moments, they could hardly be more profitably employed than in making such tools as can be conveniently used when required. A valuable accessory to a repairman's kit is shown in Fig. 2, a hack-saw frame. The hack-saw frame was made from an old coil spring, such as is shown at A in Fig. 1, and made from $\frac{1}{2}$ -inch stock. In order to use this discarded piece of steel it first was necessary to straighten it. This was done by placing it in a forge and heating it to a light red heat with the color evenly distributed, then while holding one end in the tongs and quickly clamping the other end in a vice, it was pulled out straight as possible, as illustrated in Fig. 1. The bends then were almost entirely removed by clamping each between the jaws of the vise, and the straightening process was completed with a hammer and the flat surface of the anvil, before the red color was lost. A piece of steel never should be bent or hammered after the heat has been lost to such an extent that the red color has turned to black.

The rod of stock thus obtained by straightening out the coil then was heated again, one end at a time, and bent into the form shown in Fig. 2. The entire bending was done by hand with the use of the vise to hold the hot end. When the frame was properly formed it was allowed to cool in the air, the ends were properly cut off, holes were drilled in the ends, and slots were made to receive the hack-saw blade. The holes passed at right-angles through the slots, and to remove a blade it was necessary only to spring the ends together, remove a pin which freed one end, when the other pin was removed readily and the blade taken out. In forming the frame it was most practicable to start at the handle end as shown at B in Fig. 1. When

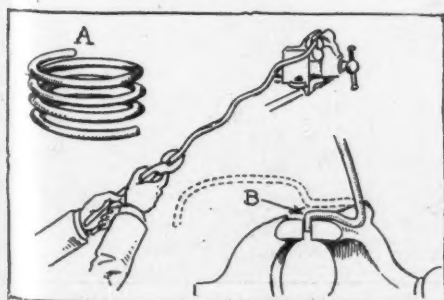


FIG. 1—SHOWING HOW FRAME IS FORMED

Hints for the Amateur

the frame herein described was finished it was found that it had lost most of its elasticity, so it was heated to a dull red heat, quenched in water and the elasticity brought back. In treating or working spring steel it should not be heated oftener than absolutely necessary, and it should not be quenched in water unless the characteristics of the metal are known.

Magneto Troubles

One of the greatest causes of magneto trouble of a serious nature comes from a disposition on the part of the amateur or near-expert to attack the magneto with a monkey wrench or a screwdriver; and it has been found by those of long experience that extensive repairs are most often required to restore an instrument to its original condition, in cases where the magneto has been disassembled by one who did not quite understand its construction. Some drivers disassemble their magnetos for the purpose of learning something about them. The desire to learn is a commendable one, but there is little or nothing to be learned about a magneto that cannot be exposed without the use of a screwdriver or a monkey wrench. Others, including junior repairmen and the like, assume a virtue if they have it not, and after carefully removing the apparatus from the motor, proceed to impress the interested owner or underlings present, by first removing the magnets and laying them in nice order upon the bench; then, finding nothing, continue to loosen whatever screws they can until as much of the instrument as would come apart readily is dismantled, expecting at every turn to find something broken off.

As a matter of fact, a broken part in a magneto is a most uncommon occurrence; the entire mechanism of almost any magneto can be removed without disturbing the magnets; magnets never should be left without a metallic connection across their ends; magnetos should never be removed from the motor at all until the trouble is known to lie therein, and if those who are inclined to get at the bottom of things always will start to look for magneto troubles at the spark plugs much unnecessary trouble and expense might be avoided. If there is a misfire on the magneto circuit, test each plug separately by removing the cable attached to it, while the motor is running, and hold it about $\frac{1}{4}$ inch from the cylinder, or from the metal base of the plug which is screwed into the cylinder, not to the top of the plug; if the spark jumps across regularly the trouble will be

found in the plug. Many make the mistake of holding the end of the cable near the terminal on the plug, and when the spark fails to jump across, because of an excessively large gap between its points, lay the trouble to the magneto and an extensive investigation ensues.

Missing with Magneto Ignition

When missing occurs in one cylinder of a magneto ignition system, first examine the spark plug, making sure that it is not fouled with oil or carbon, and be sure that the insulation is good. Note the size of the spark gap and see that it does not exceed $1/40$ inch. If possible, replace the plug with one that is known to be in good order. If the trouble continues let the motor run; take the cable off the plug of the cylinder which is missing and hold the terminal of the same cable within $1/4$ inch of the cylinder. If a spark flashes regularly the trouble still is in the plug. If no spark occurs replace the cable on the plug and pull out the magneto terminal of the same cable, holding it with $1/4$ inch of its socket in the distributor board. If no spark appears look at the safety spark-gap and see if the spark is crossing there.

If the safety spark-gap is in a position where it cannot be readily examined, remove the face-plate of the distributor and clean out the distributor thoroughly with a cloth damp with gasoline to remove all carbon dust or oil which might have accumulated therein, but do not start the motor while the distributor is damp with gasoline. When the firing is irregular this may be caused by too great a gap in the spark plugs, resulting in the spark flashing across the safety spark gap, or owing to the distributor being fouled with oil and carbon dust; or perhaps a loose connection.

Another cause of irregular firing is trouble with the switch on the dash or wheel, or in the wire leading to them. To determine whether the switch or wire is at fault, start the motor and remove the wire from the short-circuiting terminal. If the trouble disappears upon removing the wire from the terminal, examine the wire carefully for bare spots which touch the frame or motor, and also examine the switch for short-circuits.

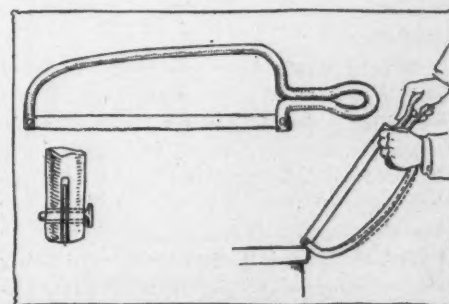


FIG. 2—THE SAW-REMOVING BLADE



Among the Makers and Dealers

Jay Makes a Change—Webb Jay has made a change from the Premier company to the United States Motor Co., becoming assistant to J. I. Handley, district manager, with headquarters in Chicago.

Orders Assets Sold—E. Q. Nye, referee in bankruptcy at Milwaukee, Wis., has ordered the Milwaukee Trust Co., receiver for the Petrel Motor Car Co., of Milwaukee, to sell the assets. The report of the appraisers, just filed, shows a valuation of \$39,641.62.

Fairbrother Goes to Des Moines—E. A. Fairbrother, for the last 3 years with the Holman Automobile Co., succeeding Mr. Hildreth as sales manager, has severed his connections with that concern and joined the sales force of the Brown-Williams Auto Co., of Des Moines.

Varnish Branch in Canada—The Glidden Varnish Co. was organized in Canada March 2, having purchased the plant, business and good will of Blackwell Varnishes, Limited, at Toronto, Ont. The plant is being remodeled and the capacity largely increased. This is to be a branch of the Glidden Varnish Co., of Cleveland, O.

Firestone Branch on Coast—A new factory-owned branch has been opened by the Firestone Tire and Rubber Co. in San Francisco at 442 Van Ness avenue. This is the third direct branch, the others being in Seattle and Los Angeles. In the latter city the Firestone company is having built a two-story block, corner Olive and Pico streets, 47 feet front and 155 feet deep.

Mossberg Plant Opens—The new plant of the Mossberg company, which manufactures motor car parts and which is located at Attleboro, Mass., now is in operation. The company has 55,000 square feet of space which will permit of the employment of 500 workmen. The main building is 500 by 60 feet and two stories high, and the smaller building is one story and 150 by 60.

Adopts Motor Trucks—The Huebener-Toledo Breweries Co., one of the largest users of horses in the city of Toledo, has adopted a motor truck delivery system. The action was taken after a demonstration in which it was proven that machines loaded with 5,500 pounds could be delivered by the truck system in one-third the time usually consumed by the horse method.

Saval Funnel—Last November the Dover Stamping and Mfg. Co., Cambridge, Mass., offered a prize of \$50 for the best name suggested for the automatic funnel which it was then putting on the market. A name has been selected, C. E. Van Bidder being the winner. The name suggested is Dover Saval, the meaning of the last word being "saves all gasoline." The word Saval has been combined with Dover on a registered

trade-mark. Twelve hundred and fifty letters were received suggesting names for the funnel.

Will Locate Elsewhere—The Kelly-Toledo Rubber Tire Co., capitalized at \$350,000, which was expected to locate in Toledo, has decided to take its plant to another city because of the failure on the part of citizens to raise \$100,000.

Keim Mills Busy—The John R. Keim mills in Buffalo are employing a large number of extra men since the controlling interest was bought by the Ford company. The number of men now at work is about 550, an increase of about 25 per cent.

C. A. Hawkins Retires—C. A. Hawkins has resigned as Pacific coast manager of the White to attend to his personal business. H. E. Doty, his assistant, has succeeded him. Mr. Hawkins was identified with the White company for 21 years.

Reedsburg's First Garage—E. C. Sweet & Son, of Reedsburg, Wis., have opened a garage and repair shop and will distribute the Regal. This is the first garage in Reedsburg, which is on the main traveled highway between Madison and La Crosse, Wis., part of the 1909 Glidden route.

Overland's Foreign Manager—Sigmund Krausz, of Chicago, has been engaged as manager of the new foreign department established by the Willys-Overland Co., and will start for Europe the latter part of April. The foreign department at the home office will be in charge of T. C. McMillan.

Moving Into a Bank—The room on Madison avenue, formerly occupied by the Dollar Savings bank, of Toledo, has been leased by the Atwood Automobile Co. and will be used as a downtown salesroom. Workmen are busy overhauling the interior of the building and placing it in

shape for its new occupants, who will take possession about April 1. It will be run in connection with the garage on Monroe street.

One More in Wisconsin—The Roe-Halverson Auto Co. has been organized at Stoughton, Wis., to handle the Overland in Dane county, which contains Madison, the state capital. The partners are Carl and Gustav Roe and S. M. Halverson. They will also distribute the Marion in this territory.

Lascaris American Manager—E. Lascaris has been appointed general manager of the de Dion-Bouton American business with headquarters at 1649 Broadway, New York city. Mr. Lascaris was one of the crew of the de Dion in the New York-Paris race and since that time has represented the French product in Chicago.

Spokane Dealers' Election—At the meeting of the Spokane Automobile Dealers' Association, of Spokane, Wash., the officers for the ensuing year were elected as follows: President, H. P. Bouffleur; vice-president, S. W. Smith; secretary, E. R. Wiggins; treasurer, H. J. Banta. Nineteen dealers have joined the association.

United States Motors Appointment—A departure has been made in the consolidation of the purchasing department of the Maxwell and Columbia under the general supervision of A. R. Gormully, with headquarters at 505 Fifth avenue, New York. Mr. Gormully has for the past 4 years been purchasing agent for the Maxwell-Briscoe Motor Co.

Willys in Texas—John Willys, president of the Willys-Overland Co., now traveling through the southwest, is investigating a proposition to locate an assembling plant for Overland cars at Dallas, Tex., in order to save freight. The Dallas branch sold 150 cars last year, contracted for 1,500 this year and expects to sell 3,500 next



MATHESONS DEMONSTRATE THEY ARE NOT AFRAID OF WATER

year. If the assembling plant is located at Dallas it will employ about 400 men.

Keeps on Growing—The American Machine Co., of Eau Claire, Wis., manufacturing a spark plug of pipestone, chemically treated has doubled its floor space and is looking for still larger quarters.

Schuster Joins Boston Branch—George Schuster, who won the race from New York to Paris for the Thomas company, has been secured by the Boston branch of that company. He will have charge of the mechanical part of the Boston branch.

Forming a Union—Efforts are being made by the International Association of Machinists to organize a Wisconsin district of employes of motor car and allied plants. Kenosha, Hartford, Columbus, Corliass, Janesville and other cities would be included.

Show at Pontiac—At the first motor show held in Pontiac, Ill., March 17, 18 and 19, the following cars were shown: E-M-F, Flanders, Buick, Maxwell, Mitchell, Metz, Pontiac, Ford, Cartercar, Overland, Reo and Hupmobile. The attendance each day was good.

Are Firestone Agents—The Firestone Tire and Rubber Co. has established two more general distributing agencies, making seven in all since January. They are the Fort Wayne Vulcanizing Works, Fort Wayne, Ind., and the Burwell-Smith Auto Supply Co., Oklahoma City, Okla.

Rock Island Talks Show—A proposition by the dealers of Rock Island, Ill., to hold a show in that city has taken well and the event probably will be held this month. It is expected to have upward of thirty exhibits, the company having displays to pay for the decorations alone, which will be about \$700. The skating rink has been offered for the show.

Million for Advertising—The MacManus-Kelly Co., an advertising agency at Toledo, O., will move its headquarters to Detroit, a change which has been hastened by a contract this company has closed to handle a \$1,000,000 advertising appropriation from the General Motors Co. A branch office will be maintained in Toledo, and an office also will be opened in New York.

Selden Dinner Planned—The Association of Licensed Automobile Manufacturers will give, on April 7, at the Hotel Astor, a dinner, which will be attended by the officers of the eighty or more car-manufacturing companies licensed under the Selden patent. The committee in charge is as follows: H. B. Joy, chairman; H. A. Lozier, Albert L. Pope, Benjamin Briscoe and R. E. Olds.

Early 1911 Deliveries—The Pierce-Arrow Motor Car Co., of Buffalo, will begin the delivery of its six-cylinder 66-horsepower cars in July in ample time for the last of the touring season. In fact, the deliveries will be made in time for the cars to be sent to Europe for summer and fall touring there, for that purpose. A number of orders for these 1911 cars have been received al-



BUSINESS OFFICE OF FULTON & ZINKE, CHICAGO

ready at the Pierce-Arrow plant and are being filed in the order of their receipt.

May Move to Ohio—The Lauth-Juergens Motor Car Co. was this week incorporated in Toledo with a capital stock of \$150,000. It is said to be backed by Fremont and Chicago parties, and that the plant of the concern will be removed from Chicago to Fremont, O.

New One for Minneapolis—The Tri-State Auto Co., of Minneapolis, has filed articles of incorporation, naming the capital at \$50,000. This company will sell the Inter-State car. The new company will build a \$10,000 garage. J. A. O'Brien is president of the company.

In New Garage—The Sweet-Edwards Auto Co., of Omaha, has moved into its new garage. The building is a one-story brick structure, 40 by 120 feet. A feature is the plate glass front, which extends clear to the floor. The show room is elevated, the floor being of maple.

Small Overland Fire—Fire caused by an overheated smokestack broke out in the engine-room of the Overland-Willys Auto-engine-room of the Willys-Overland Automobile Co at Toledo. It was extinguished by the fire department after damage to the extent of about \$400 had been done.

Dealers' Ticket Re-Elected—At the annual meeting of the Hartford Automobile Dealers' Association the following officers were re-elected: President, Ralph D. Britton; vice-president, L. H. Elmer; secretary, S. A. Miner; treasurer, Fred W. Dart. Following the election plans for the show to be held in 1911 were discussed.

Will Make Parts—The John Obenberger Co., of Milwaukee, Wis., has been reorganized and incorporated as the Obenberger Drop Forge Co., and will make a specialty of motor car parts, continuing to produce steel hammered forgings. The capital stock is \$30,000 and the officers of the new concern are: President, John Obenberger; vice-president, Henry C. Fuld-

ner; secretary and treasurer, H. W. Laidish.

All Going to Ball Game—When the baseball season opens at Swayne field in Toledo on April 13 35,000 employes of the Overland, Kinsey and Warner companies will attend in a body as guests of these three concerns.

Will Distribute the E-M-F—Minneapolis is to be the home of a branch distributing warehouse for the E-M-F. C. R. Newby, traveling representative for the Detroit concern, has been in Minneapolis to make arrangements for the location.

Pierce-Arrow Activity—It is hoped that the new buildings that are being constructed for the Pierce-Arrow company will be completed about May 1. At the present time the company is employing about 2,400 men on the day and night shifts.

Gives Up Show Idea—The show which was proposed by the chamber of commerce of Springfield, Ill., has been called off because of the late season. The date was announced as April 13 to 16, but the dealers complained that the season was too far advanced.

Moved at Last—After several months' delay, caused by the unfavorable weather and the trouble of a contractor, the Maxwell-Briscoe Columbus Co. is now installed in its new salesrooms at 58 to 62 East Spring street, Columbus, O. The establishment consists of a show room 100 by 40 feet and an annex 50 by 28. In addition offices are provided as well as a repair shop.

Making Own Bodies—The Mitchell-Lewis Motor Co., of Racine, Wis., last week completed the first patterns for Mitchell bodies in its own shops, and the new body department will begin actual production within 2 months. The new department is accommodated in the former Mitchell & Lewis wagon works, now part of the Mitchell plant under the \$10,000,000 consolidation.

COPPER-ALUMINUM ALLOYS WITH MANGANESE

COMPOSITION OF THE ALLOYS

THE composition of a system of ternary alloys is conveniently represented graphically in the form of the well-known triangular diagram. If, as in Fig. 1, we take an equilateral triangle ABC and regard the line AB as representing the system of alloys between metals A and B, while the lines BC and CA represent the two other sets of binary alloys, then any ternary alloy of A, B, and C, is represented as regards composition, by some point in the triangle ABC. This mode of representation depends upon the fact that the sum of the perpendicular distances of any such point from each of the three sides is constant for all points within the triangle, and if we take this constant sum as equal to 100, then each of the three distances represents the percentage composition of the alloys as regards the metal opposite the side to which that distance is measured. In the present case the ternary system copper-aluminum-manganese may be represented by the equilateral triangle, the three corners of the triangle corresponding to the three individual metals named. The sides of the triangle may then be divided to represent percentage composition, and lines may be drawn through the diagram, parallel to each of the sides; along any such line we have a system of alloys with one of the constituent metals present in a constant proportion. Any alloy such as that represented by the point P, Fig. 1, has thus a composition which may be ascertained either by measuring its vertical distance from each of the three sides, or by drawing through the point P three lines parallel to the sides of the triangle and noting the percentages at which these lines intersect the sides.

Selecting the Compositions

In choosing the compositions of alloys to be prepared for exploratory purposes the authors were guided in one direction by the fact that alloys of copper and aluminum containing more than 11 per cent of aluminum have been shown to be too brittle for practical use; that portion of the ternary triangle, therefore, which lies outside the 11 per cent aluminum line was provisionally ruled out—so far as the heavy alloys are concerned—since it would clearly be of interest only if it were found that the addition of manganese to the alloys were capable of exerting a considerable softening influence—and from the effect of manganese on pure copper this was not to be anticipated. It was therefore thought at the outset that a second line might be ruled along the region of 11 per cent of manganese, and that the exploration might be confined within the area enclosed by these two limiting lines and the corner of the triangle.

In view of the deoxidizing function which has been supposed to lie to a considerable extent at the root of the effect of manganese on these alloys, the authors expected at the outset of the research that the most interesting alloys, from the mechanical point of view, would be found in those regions of the ternary diagram lying close to the simple binary alloys, so that special interest appeared to attach to alloys containing from 7 to 10 per cent of aluminum and from 1 per cent of manganese upwards.

Table Shows Alloys

The composition of the twenty-two exploratory heats is given in Table 1 and Figs. 2 and 3. The table contains both the weights of metals used, the composition aimed at, and the composition attained, as determined by chemical analysis. In Fig. 2 the positions of the alloys are plotted on the diagram as corresponding to the compositions aimed at, while Fig. 3 represents the actual compositions of the alloys.

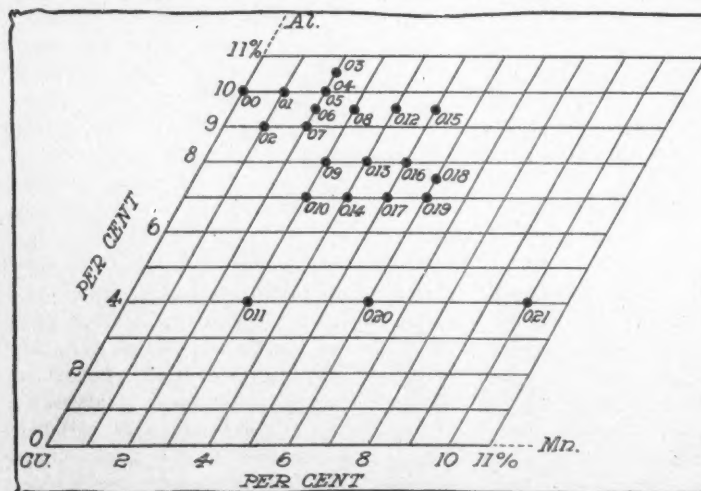


Fig. 2

PART II

EDITOR'S NOTE—The following is the second installment of the ninth report of the alloys research committee of the Institution of Mechanical Engineers of Great Britain, which report was presented in full during the session, January, 1910. The authors of this report are Dr. W. Rosenhain and F. C. H. A. Lantsberry, of the National Physical Laboratory, Tellington, Eng.

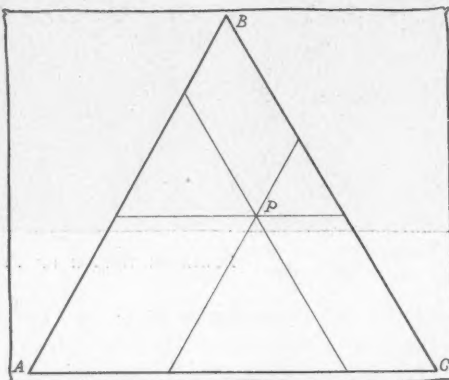


FIG. 1—ILLUSTRATING TERNARY ALLOYS

TABLE 1

Composition of "Exploratory Heats"

No.	Weights used (in ounces).			Composition aimed at.			Composition as found by analysis.		
	Cu.	Al.	Mn.	Cu.	Al.	Mn.	Cu.	Al.	Mn.
00	173	19.2	...	90	10	...	90.39	9.61	...
01	224	25	2.5	89	10	1	89.31	9.86	0.93
02	216	21.5	2.5	90	9	1	90.04	9.06	0.90
03	168	20	4	87.5	10.5	2.0	87.32	10.97	1.91
04	168	20	4	87.5	10.5	2.0	86.79	10.41*	1.91
05	248	28.2	5.7	88	10	2	88.08	10.18	1.74
06	248	26.5	5.5	88.5	9.5	2	88.74	9.46	1.80
07	228	23	5	89	9	2	88.93	9.35*	1.92
08	224	24	8	87.5	9.5	3	86.92	9.55*	2.89
09	256	24	11.5	89.0	8	3	88.8	8.08	3.12
010	192	15	6.5	90	7	3	89.7	7.51	2.79
011	216	9.5	7.0	93	4	3	93.08	3.93	2.99
012	252	27	11.5	86.7	9.3	4	86.75	9.48	3.77
013	204	18.5	9.5	88	8	4	88.23	7.75	4.02
014	236	18	10.5	89	7	4	89.27	6.99	3.74
015	192	21	11.0	85.7	9.4	4.9	85.55	9.71	4.74
016	256	24	15.0	87	8	5	86.77	8.56*	4.77
017	220	18	13.0	87.6	7.2	5.2	88.22	7.25*	4.99
018	236	20	16.2	86.7	7.3	6.0	86.89	7.36	5.75
019	220	18	13	86	7	7	84.85	8.07	7.08
020	226	10.5	15	90	4	6	90.00	4.26	5.74
021	210	10	25	86	4	10	86.28	4.12	9.60

* In these alloys the aluminum was directly determined, while in the others the aluminum content, as stated, has been obtained "by difference."

THE MECHANICAL TESTS

Two sand-castings and one chill-casting of each of the twenty-two alloys enumerated in Table 1 were machined to the dimensions of standard test-pieces, having a length of 2 inches between gauge-marks and a diameter of .564 inch, thus giving a cross-sectional area of $\frac{1}{4}$ square inch. In the following Tables 2 and 3 the higher of the results of the duplicate tests are given; except where otherwise noted there was no considerable difference between the results of the duplicates. Where these differences did occur they are to be traced to small local defects in the castings—defects which were more liable to occur in the earlier heats, before the operators had become fully accustomed to the behavior of these alloys.

It should perhaps be noted that the yield-points, as stated in the tables, represent the load at which a definite extension could be observed by means of a fine pair of dividers applied to the gauge-marks of the specimens. A decided and sudden drop of the beam of the testing machine, such as is usually observed in the case of mild steel, could not, as a rule, be detected.

Three Variable Factors

Owing to the fact that the composition of the alloys depends on three variable factors—instead of two as in the case of binary alloys—it is not possible to give a graphical representation to the results of the two tables above in a single diagram, unless recourse be taken to a model in three dimensions. For the present purpose, however, the authors prefer to give diagrams representing a few sections of the solid model which would embody the entire table. These sections yield figures resembling the diagrams connecting the composition of a series of binary alloys with their mechanical properties, but in the present case the alloys indicated on any one diagram all contain a constant proportion of one of the three constituents, while the proportions of the other two vary. Thus we may take a sectional diagram of this kind along the line pq, Fig. 3, and this diagram will represent all the alloys containing 9.5 per cent of aluminum, and variable proportions of copper and manganese, these latter being, however, always present in the proportions required to make a total of 90.5 per cent of the alloy. The diagram representing the alloys of this composition may be conveniently described as the diagram representing the line of 9.5 per cent aluminum. In all, five such lines have been taken, as representing the most characteristic groups of alloys, that is, the lines of 9.5, 7.5 and 4 per cent of aluminum, the line of 3 per cent of manganese, and the line of 90 per cent of copper. For each of these lines, diagrams connecting the composition and mechanical properties of the alloys have been prepared both for sand- and chill-castings.

Sand-Castings Data

In Fig. 4 the data concerning sand-castings of alloys on the line of 9.5 per cent of aluminum are plotted. The actual compositions of the alloys concerned in this diagram do not all lie exactly on the line of the diagram for which they have been plotted, and although the departures from an aluminum content of 9.5 per cent never exceed .36 per cent, even these small variations in aluminum content are probably responsible for some of the irregularities of the plotted points; this remark applies, of course, to an equal extent to the other diagrams—Figs. 5 to 13 inclusive—although in some cases the departure of the composition of the alloys from the line on which they have been plotted is rather larger than in the case of Fig. 4. The

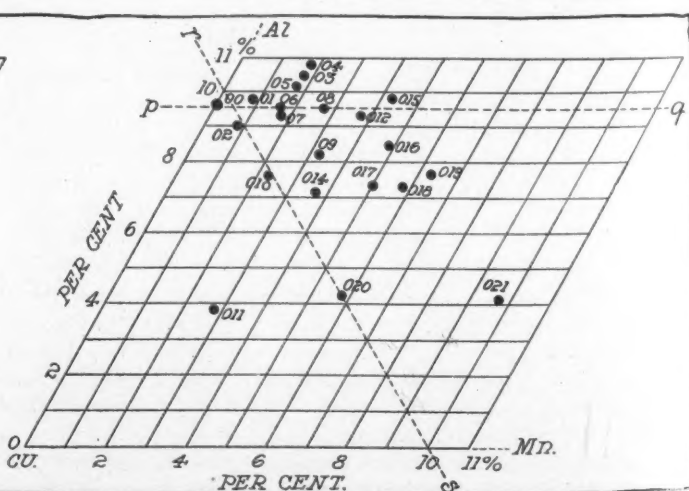
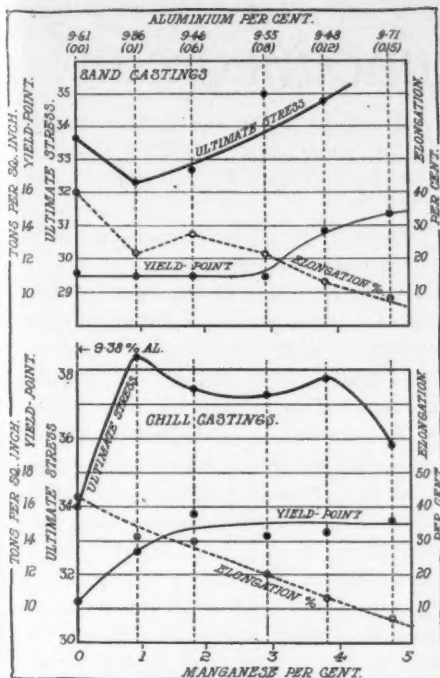


Fig. 3



FIGS. 4 AND 5

sectional diagram figures must therefore be interpreted somewhat broadly when it is attempted to derive from them an estimate of the effect of successive additions of one of the metals to alloys of the other two.

In Fig. 4 there appears to be, with increasing manganese and decreasing copper, at first a slight fall in both ultimate stress and elongation; there is then a slight rise in ductility, the yield-point remaining very nearly constant; with further increase of manganese—above 2 per cent—the ultimate stress rises somewhat rapidly, the yield-point being also raised while the ductility falls decidedly. The practical limit appears to lie near 3 per cent of manganese where an elongation of 20 per cent is still maintained. The chill-castings of the same group of alloys, shown in Fig. 5, however, present a somewhat different result. Here we see an immediate and rapid rise of ultimate stress, the maximum being apparently reached somewhere between 5 and 2 per cent of manganese, the subsequent fall being gradual—or even negligible—until 4 per cent is reached. The yield-point rises rapidly at first and then more slowly, while the elongation decreases steadily. In this diagram the alloy No. 01, with 9.86 per cent aluminum and .93 per cent manganese, is specially remarkable, as the tests of the chill-casting show an ultimate stress of 38.25 tons with an elongation of 31 per cent on 2 inches. In the diagram this follows upon the data for an alloy of copper containing 9.38 per cent of aluminum; it may, however, be also compared with the best of the chill-cast alloys of the pure copper-aluminum series, which, with

an ultimate stress of 36.93 tons per square inch, showed an elongation of 30.5 per cent. The alloy No. 01 thus represents an increase of 1.5 tons per square inch without any reduction of ductility, and this result appeared to the authors to indicate that this alloy, and those in its neighborhood, were worthy of closer study. Alloys of this type were therefore made in larger quantities, and examined both in the cast and rolled state, in the manner described below.

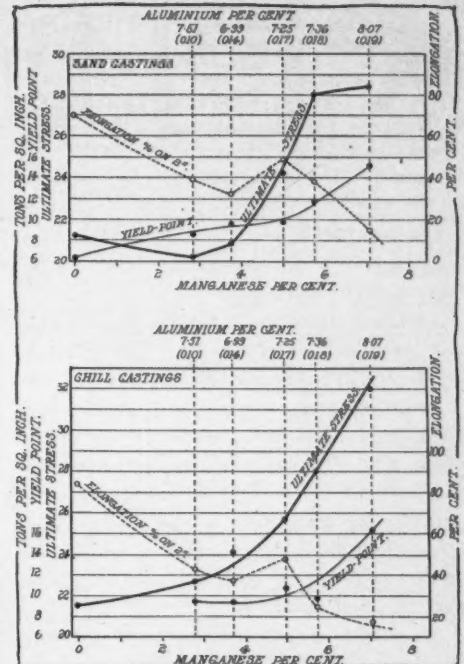
Figs. 6 and 7 refer to the sand and chill castings of the alloys containing approximately 7.5 per cent of aluminum. In both these diagrams we see a decided and steady rise of ultimate stress and yield-point with increasing manganese, accompanied by a fall in elongation. The alloy with 4.99 per cent of manganese appears to be an exception to this general tendency, and seemed to offer a field for further study. In view, however, of the very high ductility of this alloy and its relatively low ultimate stress and yield-point, the authors, when deciding upon alloys for further study, were led to select compositions of approximately 8 per cent of aluminum and 4 and 5 per cent of manganese respectively.

The alloys along the line of 4 per cent of aluminum were prepared in the preliminary exploration for the purpose of ascertaining approximately the effect of increasing proportions of manganese on the very ductile alloys containing little aluminum. The be-



ROCHESTER CLUB ELECTION

Rochester, N. Y., March 21—The annual dinner of the Automobile Club of Rochester was held this evening and was attended by several prominent out-of-town motorists. Following the dinner came the annual election which resulted as follows: President, H. G. Strong; first vice president, W. C. Barry, Jr.; second vice-president, W. W. Hibbard; treasurer, W. W. Dake; secretary, Bert Van Tuyl. Directors, for 3 years, W. C. Likly, C. J. Brown, Robert C. Shumway, A. R. Potter; for 2 years, R. M. Searle, C. F. Wray, S. H. Mora, George Dietrich; for 1 year, John R. Morry, Rudolph Schmidt, James E. Gleason, George C. Jordan; consulting engineer, A. J. Ro kwood; attorney, Henry Shedd.



FIGS. 6 AND 7

havior of these alloys is represented in Figs. 8 and 9. The results obtained are peculiar, since the effect of the added manganese appears to be opposite in the sand and chill castings respectively. In the sand castings the tensile strength diminishes steadily with increasing manganese content, while in the chill castings there is a decided and steady rise in tenacity, while in both kinds of castings there is a slight rise of the yield-point with increasing manganese. The elongation also diminishes steadily in the same sense in both classes of castings.

In spite of the irregularities of the various curves, the results embodied in Figs. 4 to 9 afford a clear insight into the influence of manganese on these alloys. Broadly speaking, this effect is similar to that of aluminum itself, in hardening the alloys, generally increasing the tenacity and reducing the ductility; in the alloys which contain a quantity of aluminum approaching 10 per cent, however, the first of these effects makes itself felt before the second, so that the addition of suitable proportions of manganese appears to give promise of effecting a decided improvement in the best of the copper-aluminum bronzes. The more detailed study of selected alloys was therefore devoted to the purpose of determining the exact effects and limitations of this addition of manganese.

(To be continued next week.)

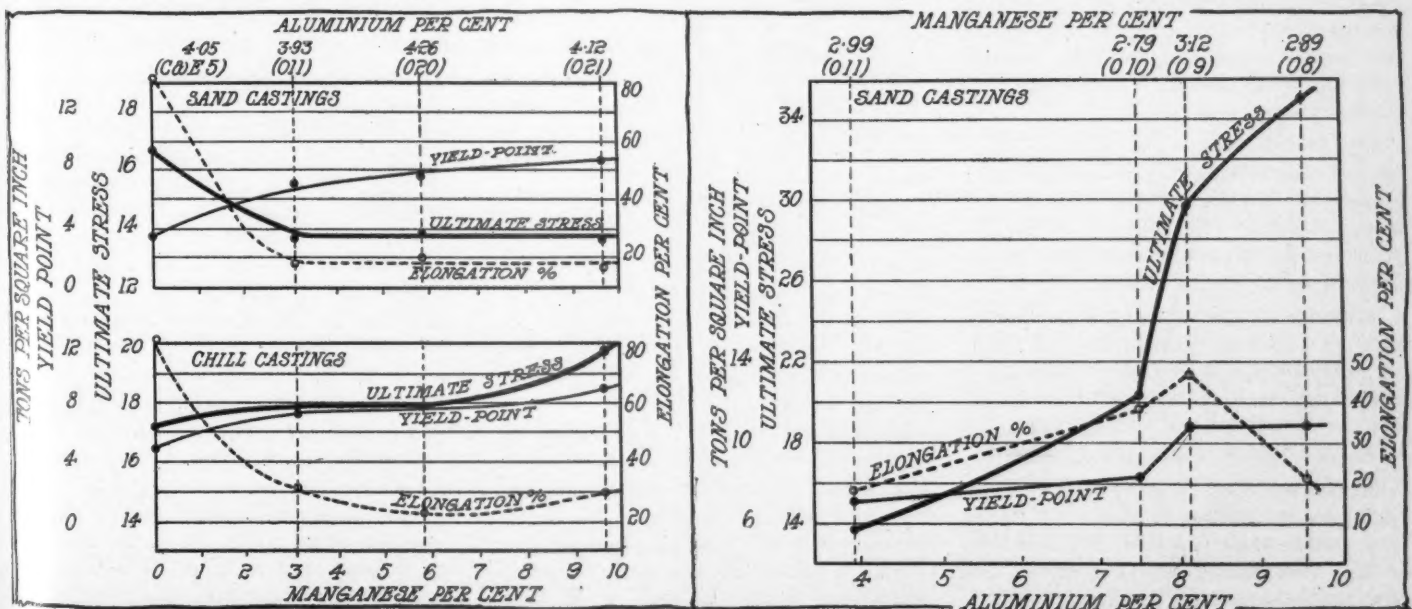


FIG. 10



Brief Business Announcements



Eureka, Ill.—F. B. Stumpf has opened a new garage.

Detroit, Mich.—Charles B. Calvert is building an eight-car garage, 50 by 80 feet, at 651 Cass avenue.

Atlanta, Ga.—L. L. Barnes has joined the sales organization of the Atlanta branch of the Maxwell-Briscoe Motor Co.

Paducah, Tex.—A motor bus line has been organized to operate between Paducah and Matador, and run two cars each way daily.

Pittsburg, Pa.—Buhl & McCullough, who have the Pittsburg agency for the Brush, have secured new quarters at 5902 Penn avenue, East End.

Cleveland, O.—The Peerless Motor Car Co. is progressing with the work of its new buildings on East Ninety-third street and Quincy avenue.

Milwaukee, Wis.—The Leo Hofmeister Co., one of the largest oil supply houses in the northwest, has increased its capital stock from \$30,000 to \$50,000.

Philadelphia, Pa.—The Olds-Oakland Co. has been enlarged and taken in John H. Bromback and William N. Bromback, of Bryn Mawr, as vice-president and treasurer.

Boston, Mass.—Malcolm R. White, formerly vice-president and general manager of the Standard Motor Car Co. of Massachusetts, has severed his connection with the company.

LaCrosse, Wis.—The Bergh Piano Co. has engaged in the motor car business as an auxiliary to its extensive music trades. It will represent the White steam and gasoline cars and the Buick.

Washington, Pa.—The Washington Automobile Co. has fitted up a garage on East Maiden street in that city, and will handle the Lozier, Locomobile, Pullman, Oldsmobile, Chalmers, Cadillac and Hudson. D. H. Swart is proprietor.

Eau Claire, Wis.—The Tanberg Auto Co., of Eau Claire, Wis., has opened a branch in Chippewa Falls, Wis., at 203 Bridge street. The company represents the Peerless, Winton, Oldsmobile, Buick, Oakland and Waverley electric.

Milwaukee, Wis.—The Joseph Schlitz Brewing Co., of Milwaukee, Wis., is building a \$3,000 garage at Cherry and Second streets for the exclusive use of its trucks and cars owned by its officials and other members of the Uihlein family.

Sheboygan, Wis.—Sheboygan is attempting to get the Zachow & Besserdich Co. of Clintonville, Wis., patentee of a new type of four-wheel drive car, to locate in this city. The Commercial Association of Appleton, Wis., announced recently that it

has practically completed negotiations for the removal of the shops to Appleton.

Dover, Del.—A charter has been granted to the Simmons Motor and Truck Co., of Wilmington.

Kansas City, Mo.—M. J. Fleming granted a permit for brick garage at 311 West Thirty-fourth street, to cost \$6,200.

Springfield, O.—The National Motor Co., with R. D. Tittle, president, is to build on the corner of George and Columbia streets.

Philadelphia, Pa.—Permits have been granted to Harry Woolener for a two story garage, 45 by 90 feet, at 5015 Warren avenue, to cost \$5,000.

Baltimore, Md.—The White Automobile Co. is erecting a large modern fireproof structure at Mount Royal and Guilford avenues, 136 by 75 feet, two stories high.

Eau Claire, Wis.—The Taylor-Prior Co. has commenced work on its new garage on South Barstow street. It will be of cement block construction, fireproof and will include a large repair and storage.

Fond du Lac, Wis.—The Anderson Motor Car Co., of Fond du Lac, Wis., is district agent for the Mitchell and Maxwell in a large territory of central Wisconsin. M. M. Anderson is manager. The garage and salesrooms are located at 34-38 West Second street.

Spokane, Wash.—The Mitchell-Lewis Motor Co., of Racine, Wis., has filed papers in Spokane county. The company is a reorganized corporation of the farm machinery and implement manufacturing firm, which has been doing business throughout the country for a number of years.

Riverside, Ill.—Charles W. May has opened the Riverside Garage and Motor Co. The garage is equipped with repair tools, air compressor, lathes, and an expert machinist is in charge. A supply of accessories is carried and a charging station for electrics is part of the equipment.

Joliet, Ill.—Two new garages were opened in Joliet last week, one by the Will County Automobile Repair Co., at Van Buren and DesPlaines streets, and the other by the Lewis-Koontz Automobile Co., at 1601 Collins street. The former company has the Oakland car and the latter has the Auburn.

Philadelphia, Pa.—William Noblit, formerly of the Philadelphia Packard branch, has joined the sales force of the local Chadwick branch. Warner J. Macfarlane, formerly with the Renault company's New York establishment, has signed with the Longstreth Motor Car Co. A. A. Jones, formerly of the Philadelphia Ford branch,

has tied up with the local Maxwell-Briscoe branch.

Fairbury, Ill.—Wilbur S. Stephens has opened a garage here.

Harrisburg, Pa.—A charter has been granted to the Bradford Garage Co., of Bradford. Capital, \$8,500.

St. Charles, La.—H. M. Bradley, of Kansas City, is to erect a large factory for the construction of high-speed motors.

Philadelphia, Pa.—Tom Berger has joined the forces of the Taylor Motor Distributing Co., which handles the Warren-Detroit.

Philadelphia, Pa.—The Chalmers-Hipple Motor Co. plans for the remodelling of 206 and 208 North Broad street, for the handling of Chalmers and Hudson cars.

Rice Lake, Wis.—The Northwest Wisconsin Automobile Co. has succeeded T. H. Field, agent for the Overland and the Reliance motor cycle. Mr. Field is proprietor of the new concern.

Philadelphia, Pa.—The Fanning Motor Co. will shortly move into the quarters to be vacated by the Chalmers agency at Broad and Vine streets. The latter concern is remodeling the building at 606-608 North Broad street.

St. Louis, Mo.—The St. Louis offices of the contract agent of the Electric Storage Battery Co., of Philadelphia, which now are located in the Wainwright building, will be moved, March 28, to 1205-6-7 Fullerton building, Seventh and Pine streets, St. Louis.

Madison, Wis.—The Hokanson Automobile Co. has established another branch at Mount Horeb, Wis., making seven. The company is using freight cars to supply its branches. O. Smesrud has been appointed local agent in charge of the Mount Horeb agency.

Patchogue, N. Y.—James Thorn, of New York, has leased a building for a garage, and is planning cross-island motor bus-line between Patchogue and Port Jefferson, and also may operate a line between Brookhaven and Sayville, L. I., with another garage at Medford.

Clarksville, O.—The Kirkpatrick-French Motor Car Co. has purchased a lot at Broadway and South streets, where a \$12,000 garage will be erected. The building will be two stories high and will have 6,000 square feet of floor space. The basement will be used for a repair shop.

Asheville, N. C.—The Asheville Cycle and Automobile Co. has changed its name to the Asheville Automobile Co., having been out of the cycle end of the business for 3 years, and in order to shorten the name it has eliminated the two words "Cycle and." There has been no change

in the ownership, merely a simplification of the name.

Easton, Ill.—H. H. Harvey has opened a garage and repair shop.

Mobile, Ala.—The Ross Motor Co. is handling the Moon, Rapid truck, Federal tires, and supplies. Alfred G. Ross is the manager.

New York—The United States Motor Co. has opened temporary offices at 505 Fifth avenue, where it is to take the entire ninth floor.

Detroit, Mich.—The Lozier Motor Co., of New York, which originally was incorporated here for \$10,000, has increased its capital to \$2,000,000.

Kansas City, Kan.—The sales department of the Smith Motor Car Co. has been moved from Topeka to the Smith Auto Company, 3116 Main street, Kansas City.

Milwaukee, Wis.—The Curtis Automobile Co. is building a new garage on Eighth street, near Grand avenue, opposite the large garage of the McDuffee Automobile Co.

Yoakum, Tex.—Will & Leonard Orth have let a contract for two-story building of corrugated iron and concrete for use of garage to accommodate twelve machines and for repair shop.

Long Island City, N. Y.—A contract has been awarded to Thomas McKee, of Mineola for the erection of a grandstand of steel, concrete and wood, with restaurant and motor exhibit floors, 38 by 125 feet, to cost \$15,445.

Seattle, Wash.—The F. H. Bardshar Co. is installed in its new home at Fifth and University streets. The space occupied is 35 by 120 feet. The Bradshar company is a co-partnership among F. H. Bradshar, D. E. Bradshar and Thomas G. Young.

Rock Island, Ill.—D. W. Wisherd, of Rock Island, has purchased a piece of property with 40-foot frontage on Herald square, Quincy, and will erect a \$10,000 garage on the site. Mr. Wisherd will handle the Overland car in Adams county.



Washington, D. C.—Capital Auto Co., Parry.

Washington, D. C.—Barber & Hill, Demot.

Washington, D. C.—George W. Wells, Warren-Detroit.

Hartford, Conn.—D. C. Lull, Speedwell.

Hartford, Conn.—New England Garage Co., Cutting.

Philadelphia, Pa.—S. R. Blockson, Cutting.

Philadelphia, Pa.—Bergdoll-Hall Co., Benz.

Little Rock, Ark.—Tedford Auto Co., Moon.

Decatur, Ill.—Willis C. Tandy, Pierce-Racine.

Alton, Ill.—R. A. Pfaff, Haynes.

Alton, Ill.—Roy Holden, Oldsmobile and Overland.

Indianapolis, Ind.—Knickerbocker Auto Co., Paterson.

Indianapolis, Ind.—Herbert McDermid, Regal.

He also has the Rock Island agency and will continue to reside in the latter place.

Beloit, Wis.—The Warner Instrument Co. is building an addition to its factory, 32 by 100 feet.

Philadelphia, Pa.—The Franklin Motor Car Co. has bought a site 55 by 100 feet on Sampson street, and will construct a building.

Houston, Tex.—The Houston Motor Car Co. is building a new garage at the corner of Caroline and Preston streets, which will be ready April 1.

Grand Rapids, Mich.—The Continental Motor Mfg. Co. is erecting a brick and steel building, 66 by 156 feet, and will employ 400 or more machinists.

Philadelphia, Pa.—The E-M-F Co. will locate a new building at the south-west corner of Broad and Collowell streets. When completed it will have a showroom of 40 by 60 feet, besides additional space for offices, etc.

Monroe, Wis.—Holloway & Buehler, proprietors of the Monroe garage, have disposed of their interests to Richard Patterson and Everett Kiel, who have organized the firm of Kiel & Patterson. By this and previous purchases, the new company now has a line of thirteen agencies.

Houston, Tex.—Application for a charter for the Standard Auto Co. has been made. E. E. Guthrie and G. F. Cotton and a number of others are interested. A garage, sales and display rooms are to be at San Jacinto street and Prairie avenue, now occupied by the Houston Motor Car Co.

Rock Island, Ill.—C. S. Lidders, agent for the Reo line at Rock Island has opened a new garage, work on which was commenced last fall. The building, located at 1725 Fourth avenue, has a frontage of 25 feet and is 150 feet deep. It is one story, of brick with cement floor, and is fire-proof throughout.

Newark, N. J.—A permit has been granted to Carl Merz for a one-story garage at 420 Bank street, to cost \$1,000; also to E. C. Rhodes, of 876 Mount Pleasant avenue, for one-story cement garage, to cost \$900, and to George Weyranch, of 280 South Orange avenue, for a one-story garage, to cost \$450.

Zanesville, Wis.—The Willard-Harlow Mfg. Co. has been granted a charter in Wisconsin. The company is capitalized at \$25,000. The purposes of the concern are to manufacture and deal in motor car specialties and steam-heating appliances. J. C. Harlow, A. E. Bigham and P. H. Korst are the incorporators.

Toledo, O.—Another new concern, incorporated at Toledo, with a capital of \$50,000, and to be known as the Toledo Regal Sales Co., has been launched. The incorporators are W. S. McMurray, H. J. Chittenden, A. L. Trautwein, Wm. Rothert and Charles Rothert. The concern will have the agency for the Regal in north-



Brooklyn, N. Y.—French-American Automobile Co., capital stock, \$4,000; to manufacture, repair and store motor cars, motor vehicles, etc. Incorporators, Joseph E. Marquette, Benedict Mandelberg, Robert W. Ferguson.

Brooklyn, N. Y.—Automobile Horn Co., capital stock, \$100,000. Incorporators, John T. Allan, George Dittman, Leon Raunheim.

Chatham, N. Y.—Modern Auto Appliance Co., capital stock, \$2,000. Incorporators, Frank B. Pratt, William H. Housman, Harry A. Branion.

New York—Cimlotto Brothers, capital stock, \$2,000; to manufacture all parts of motor vehicles, tools, etc., and deal in all wares pertaining to motor cars. Incorporators, Frederick Cimlotto, Walter F. Cimlotto and Paul Cimlotto.

New York—Swan Equipment Co., capital stock, \$5,000; to manufacture and deal in engines, motors, motor car and air-ship motors, etc., compressed air specialties, manufacture and deal in machinery, tools, etc. Incorporators, Willis A. Swan, Edward Pinney and Irwin Kurtz.

Philadelphia, Pa.—Chester Automobile and Tire Co., capital stock, \$500,000. Incorporators, Joseph L. Swain, George M. Bryson, Wynn Armstrong.

Albany, N. Y.—Park Garage Co., capital stock, \$10,000. Incorporators, Frank N. Slingerland, Theodore Kupke, Harry C. Slingerland, William McDonald, Donald McDonald.

Auburn, Ind.—Double Fabric Tire Co., capital stock \$10,000; to manufacture parts. Incorporators, W. H. Willmar, A. M. Murray, Vera L. Williams.

Dallas, Tex.—Michell Auto Co., capital stock, \$10,000. Incorporators, T. E. Harvey, R. O. Harvey, C. S. Staten, E. T. Staten.

Chicago—Standard Limousine Co., capital stock, \$5,000; to manufacture motor cars and other vehicles. Incorporators, B. Carlson, C. R. Parsons, C. A. Carlson.

western Ohio, and take over the local business of W. S. McMurray.

Houston, Tex.—Gaines & Brown are erecting a garage, 80 by 40 feet.

Rochester, N. Y.—Thomas J. Northway secured permit for the erection on 104 Exchange street of a \$20,000 garage.

Janesville, Wis.—Baack, Reed & Gage Co., a new garage and agency concern, has absorbed the Roy Pierson garage.

Stoughton, Wis.—The Roe-Halverson Auto Co. has leased part of the Peterson blacksmith shop on Main and Fifth streets, and this now is being converted into a garage.

Baltimore, Md.—The Dixon C. Walker Automobile Co. is completing a garage to hold forty-five machines at Charles and Twentieth streets, with large show rooms, storage and work shops.

Toledo, O.—The Mutual Auto and Garage Co. has been organized. The company will take care of the business of its stockholders numbering 450 owners of machines, and will maintain a garage.

Buffalo, N. Y.—The Superior Motor Vehicle Co. is figuring on a one-story and basement factory, 70 by 450 feet, on Elmwood avenue near Grate street. It is to be of reinforced concrete and steel, and later the company will erect another 70 by 500 feet.



Legal Lights and Side Lights



DIDN'T WEIGH HIS WORDS

THE following case, *O'Reilly vs. Davis*, 120 N. Y. Sup. 883, furnishes a rather amusing example of what startling testimony is sometimes given—doubtlessly with entire innocence—by the complaining party as to the speed of a motor car:

"The plaintiff, with a companion, was walking toward the west on a trolley track, and hearing, but not seeing, a car coming in front of him, stepped to the right into a familiar road, frequented by vehicles, and was struck by the defendant's motor car. His statement is: 'Just as I was stepping off the rail I looked back to see if anything was coming along there, and didn't see a thing, and then I stepped off and walked 4 or 5 feet and I was hit by something. That is perfectly and absolutely correct . . . From the place where I was hit up to the top of that hill at Bachman's hotel, I could see right up there. There was nothing to obstruct my view. . . . The crown of that hill toward Bachman's from where I was hit is, I judge, 200 feet. I could see a motor car when it got on top of that hill.'

"So, able to see 200 feet, and looking, the plaintiff walked 5 feet and was hit; that is, while he was walking 5 feet, the motor car came 200 feet. Hence the car was going forty times as fast as the man, and, assuming that the man was walking 3 miles an hour, the car was going 120 miles an hour."

In a New York case, *Miller vs. New York Taxicab Co.*, 120 N. Y. Sup. 899, the evidence of the plaintiff, though seeming rather incredible, was held sufficient to take the case to the jury for determination.

"The accident occurred as the plaintiff and her companions were crossing Second avenue—in New York city—in the northerly cross-walk from east to west and as the plaintiff was between the westerly car tracks. The plaintiff and all the other witnesses, who were crossing the avenue together, testified that they looked both up and down the avenue before they went upon the tracks, but saw no car or motor car. Each of them denied having seen the motor car until the moment of the collision.

"From this testimony the case was entitled to go to the jury. Her case was that, being upon the cross-walk, where she had an equal right with the defendant, and exercising due care, she was struck by a motor car which none of the witnesses had seen until the moment of the collision, although they had taken particular pains to look for it. This state of facts is conceivable, and made out a prima facie case of negligence against the defendant, and of freedom from contributory negligence on the part of the plaintiff. Wheth-

er or not the testimony was credible was for the jury to say in the first instance. The judge could set their verdict aside if he was dissatisfied with it, but he could not dismiss the complaint when the evidence on its face made out a case for the plaintiff."

JUDGES DISAGREE

A recent New York case, *Bradley v. Jaeckel*, 119 N. Y. Sup., 1070, is of peculiar interest in that it shows the dissenting views of two judges of the same court as to the duty of a pedestrian with regard to a motor car. The facts showed that the plaintiff, who was starting to cross Thirty-sixth street in New York city, looked in only one direction for any approaching motor cars—that is, he looked only in the direction which a motor car could have approached from if it had been running on the right side of the street, and did not look to see if, from the opposite direction, a motor car might not be coming toward him on the wrong or left side of the street. On these facts it was contended by the defense that such a failure on the part of the plaintiff amounted to contributory negligence and would bar his recovery. The majority of the court held that this failure was not negligence. The court said:

Legal Motoring Angles

No. 3

So many concerns are going into the motor livery business, particularly in towns and villages the size of which would prohibit the operation of taxicabs, that a few paragraphs on the duties and liabilities of the owner of such a business seem to be pertinent. Xenophon P. Huddy, a member of the New York bar, who is a motoring Blackstone, discusses the subject in his book, "The Law of Automobiles." According to Mr. Huddy, a party who hires a car from another is bound only to take ordinary care of the machine and is not responsible for damages inflicted to the car if ordinary prudence has been exercised while the machine was in his custody as the bailee. He holds that the hirer is responsible for the negligence of his chauffeur, provided the negligence took place when the chauffeur was in the discharge of his duty or obeying the commands or instructions of the master, expressed or implied. If a car is lost through theft or is injured as a result of violence the hirer is not responsible except when imprudence or negligence caused or facilitated the injurious act. To recover a car which has been rented and which may have been sold by the person who hired it, it may be recovered by means of an action of trover against the bona fide purchaser.

Especially would it be unwarranted to hold that when a person steps from the curb of a city street, particularly one not constituting an important artery of traffic, that he must look, not only in the direction from which vehicles may rightfully be traveling on that of the street, but that he must look back as well, in order to be sure that nothing is approaching from the rear on the side of the street prohibited by the rule of the road to vehicles traveling in that direction. It is no hardship upon owners of motor cars which are traveling silently and without any signal of warning, as in this case, and on the wrong side of the street and close up to the curb to hold that the person in control of the car must be observant, not only of what is directly in front of it, but of pedestrians who are traveling on the sidewalk and who may step into the street in front of the car. In such a situation the driver of the car should either give a signal of warning to any pedestrian who is traveling on the sidewalks and may come into a position of danger if he steps off the curb, or should run his car at so slow a rate that it would be under such control that injury could not be caused to such pedestrian.

Judge Gehman, dissenting, said, in part:

While I am unwilling to concur with Justice Giegerich in his statement as to the duty of care on the part of a chauffeur driving in the city streets, I believe that there are few, if any, accidents which a careful chauffeur could not avoid, unless the pedestrian himself was at fault. A motor car has no exclusive right of way either at crossings or between crossings, and the driver should at all times have this machine under such control that he will not injure a pedestrian in full possession of his faculties, who himself uses ordinary care. Nevertheless, the pedestrian also is bound to use due caution to avoid an accident, and must show as part of his affirmative case that he did use due caution. To meet this burden, the plaintiff has testified that he looked both ways before he started to cross the street. The uncontradicted evidence totally discredits this testimony as shown in the opinion of Justice Gerzerich. He either did not look towards Fifth avenue, or if he did, he saw this machine, and deliberately walked into danger. There remains therefore no creditable testimony that will show an absence of contributory negligence. To affirm the verdict of the jury, we must hold that, where a person crosses a street without looking for approaching vehicles, he is not guilty of contributory negligence, if he is struck by a vehicle on the wrong side of the street where he had no warning of its approach.

GUEST NOT TO BLAME

A person who is simply the guest of another who in town has hired a motor car for the purpose of taking the guest for a ride, cannot be charged with the negligence of the chauffeur in charge of the car. A Mrs. Dale was visiting in Denver and was the guest of a friend, who took Mrs. Dale along with some other women for a ride in a hired motor car. The chauffeur carelessly and recklessly turned the machine across the street car tracks without taking the precaution to see if a street car was approaching. The collision which followed resulted in the death of Mrs. Dale. The ensuing suit was *Dale vs. Denver City Tramway Co.*, 173 Fed. 787. The court in part says: "That the chauffeur was guilty of gross negligence in turning the motor car to cross the track, not having taken reasonable precautions to ascertain whether or not the street car was close behind him, does not admit of doubt; but Mrs. Dale, the deceased, was an occupant of the car as a guest, and did not have charge, or control, of its movements. The negligence of the chauffeur, therefore, is not imputable to her."